E-BIZ HELPER IBM CEO Louis Gerstner expects the firm's new Freeway mainframes to handle huge e-business workloads. Page 10

THE TIES THAT BIND The method of using multiple ISPs to provide reliable 'Net access is becoming popular. Page 28

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NetworkWorld

July 24, 2000 Volume 17, Number 30

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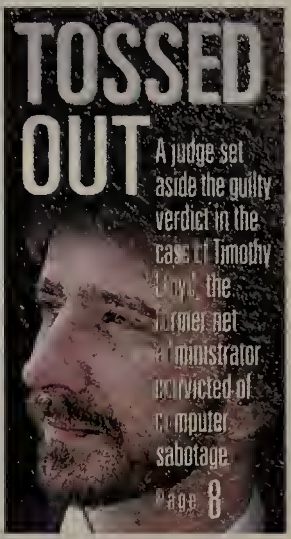
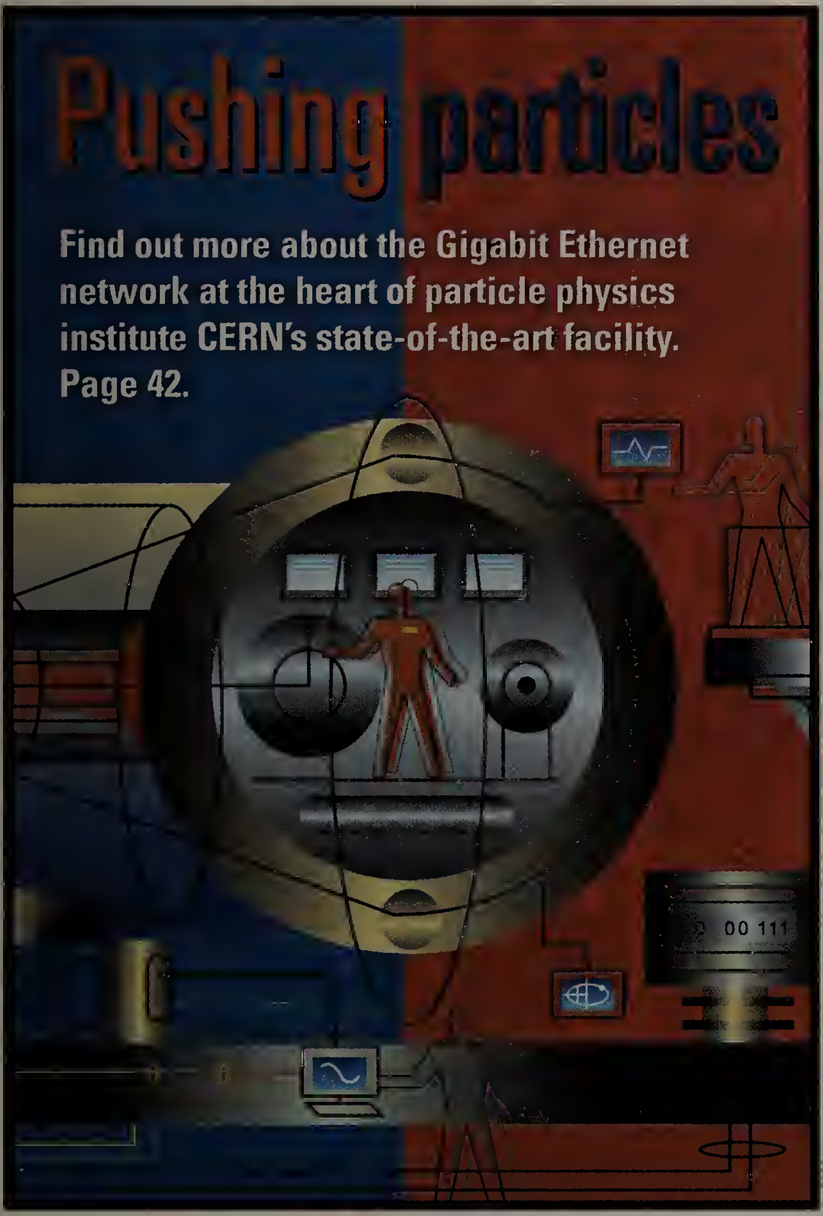


TOSSED OUT A judge set aside the guilty verdict in the case of Timothy Lloyd, the former net administrator convicted of computer sabotage. Page 8



Pushing particles

Find out more about the Gigabit Ethernet network at the heart of particle physics institute CERN's state-of-the-art facility. Page 42.

HANK OSUNA

Denial-of-service threat gets IETF's attention

BY CAROLYN DUFFY MARSAN

Remember the denial-of-service attacks that brought Amazon.com, CNN.com, eBay and other popular Web sites to their knees in February? The Internet engineering community is developing technology that promises to minimize the damage these hacker attacks cause by quickly identifying the computer systems where they originate.

The Internet Engineering Task Force (IETF) last week launched a working group to develop ICMP Traceback Messages, which would let network managers discover the path that packets take through the Internet. Nicknamed itrace, the new working group plans to submit a proposed standard for traceback messages to the IETF leadership next January.

Itrace can't prevent denial-of-service attacks. But it will be an important tool for network managers trying to isolate and stop these attacks. The itrace approach also can address

See **IETF**, page 14

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DRAFTING ITRACE

Could itrace help sort out denial-of-service attacks? Find out by reading the IETF proposal from AT&T Labs.

find it DocFinder 9142 online

Losing the grip on IP

Has Nortel Networks bungled Bay buyout?

BY JIM DUFFY

When announced in June 1998, the merger of Nortel and Bay Networks was hailed by officials of both companies as a metamorphosis in the industry.

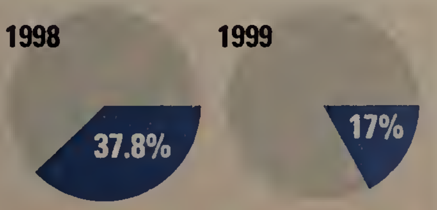
The move was an admission by an old guard telecommunications equipment giant that the future of networking is in data — even for voice. The deal remains the most aggressive move to date by a telco stalwart to transform itself into an IP packet-switching powerhouse virtually overnight.

"Data has a growth rate of 30% to 40% per year, and it's driven by the Web," Nortel CEO John Roth said in 1998,

See **Nortel**, page 16

Layer 3 losses

Though Nortel's revenue in Layer 3 switching grew from 1998 to 1999, its market share shrank by more than 50%.



SOURCE: DELL'ORO GROUP, PORTOLA VALLEY, CALIF.

Nortel's switched Ethernet market share

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Directories meet e-comm

Integration with XML-enabled apps will be key.

BY JOHN FONTANA

SAN DIEGO — Long thought of as a place to manage end users and organize lists of employees, the enterprise directory is quickly evolving into a platform for e-commerce and a key technology for use with XML-enabled applications.

That evolutionary process and its importance for enter-

See **Directory**, page 73

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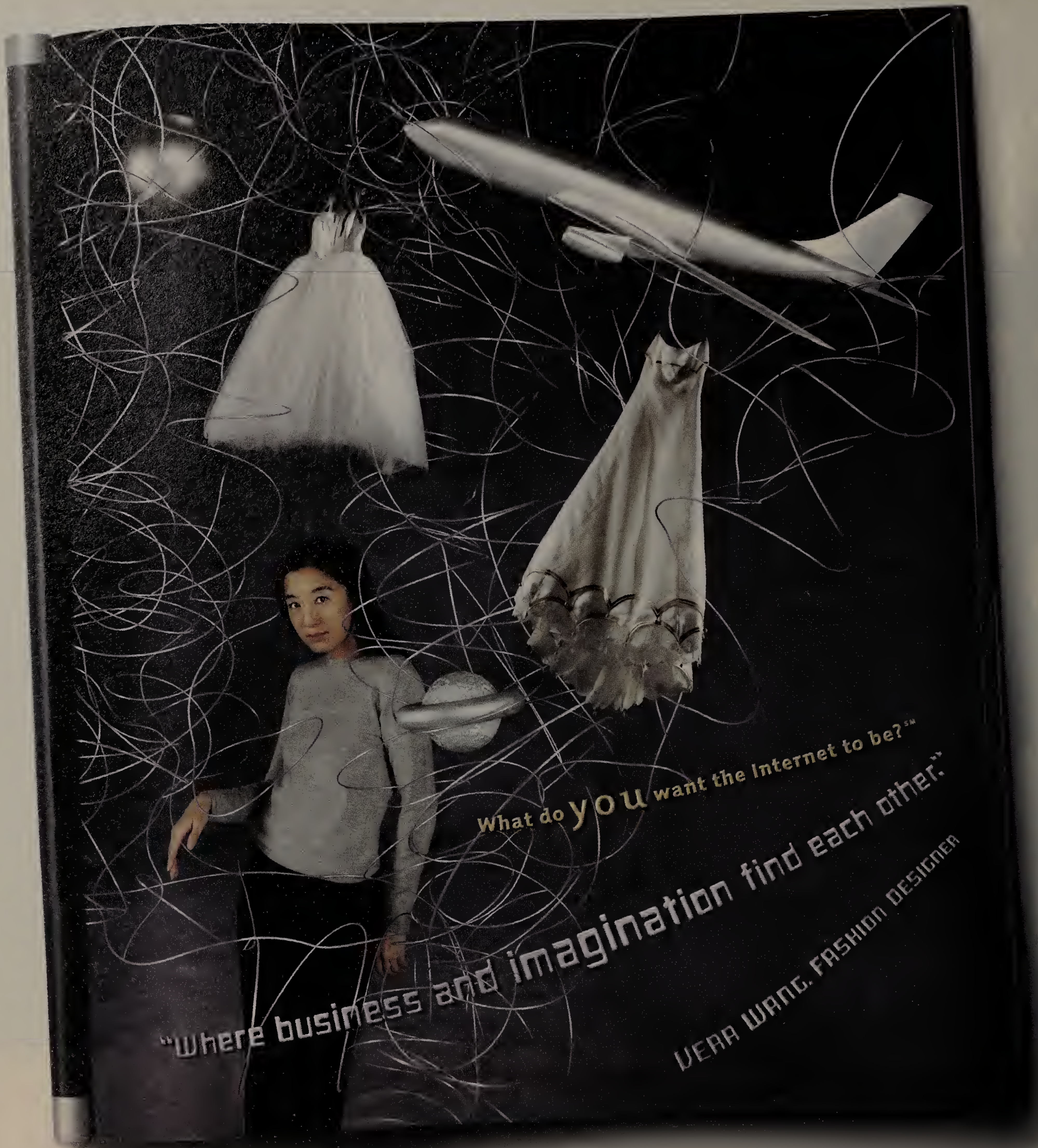
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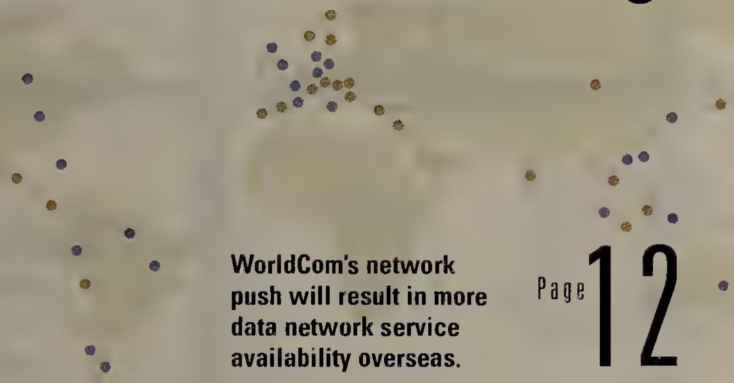

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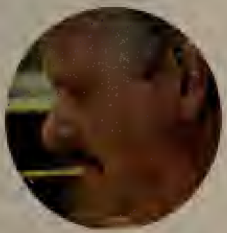

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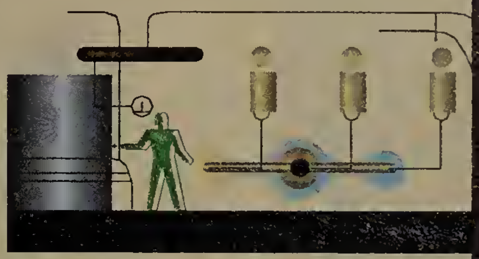

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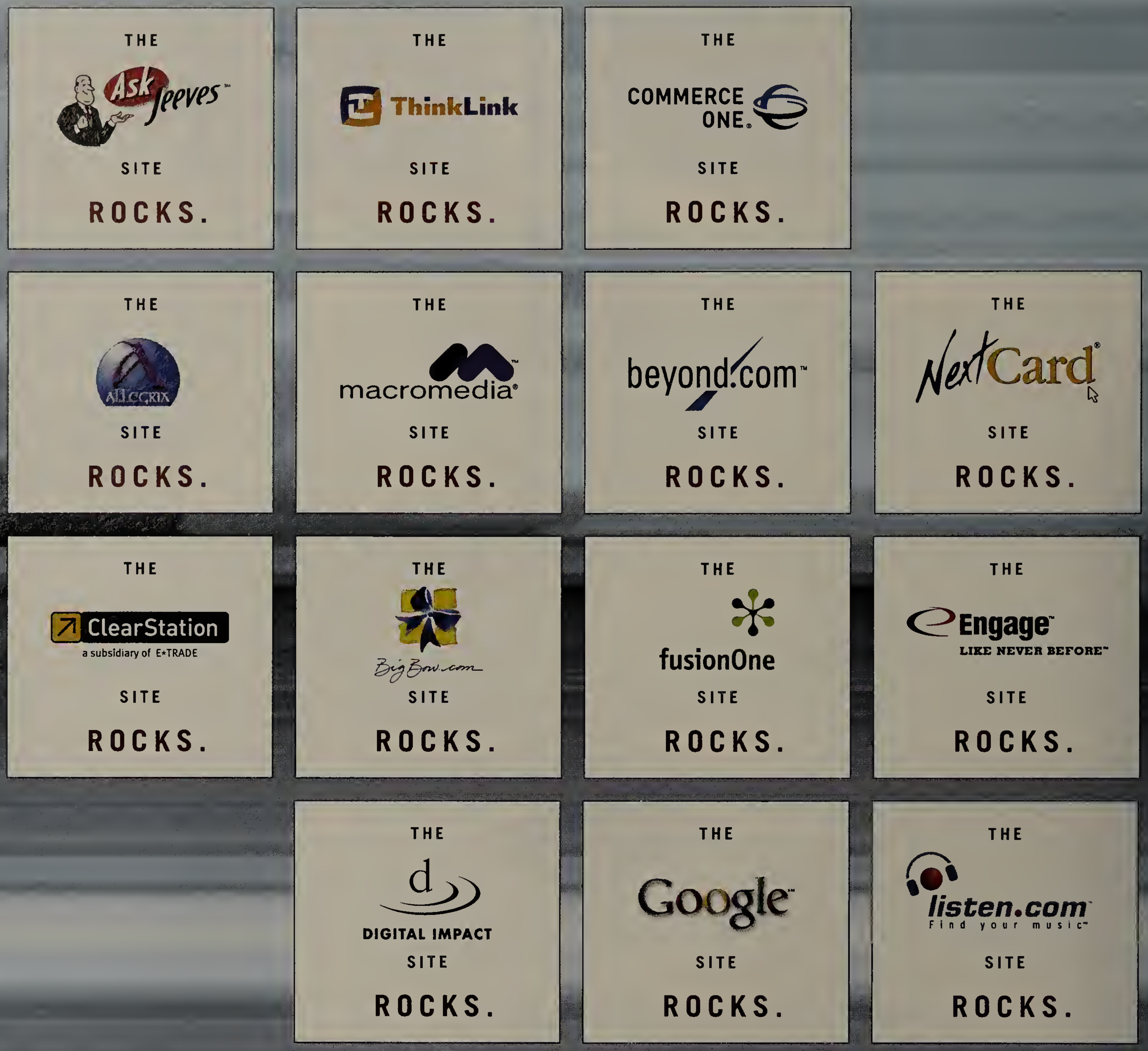
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INTERACTIVE

Tackling the tough questions

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Knowledgebase

- Experts Exchange is just the tip of the iceberg on the professional advice we have available for you. Need help with your corporate network? Dr. Intranet can help you sort out those tough problems. Or maybe something's wrong with your remote access for end users? Ask Help Desk Editor Ron Nutter what he thinks, and you're sure to get the answer you need. Also, try out our resources area. Gearhead's Mark Gibbs (above) is available to tell you about the latest new tools he's test-driven. Want to know about a product on the way? Just send him a quick note, and he'll tell you what he thinks. **DocFinder: 9135**

Peers talking

- We gathered five of your peers to talk about the tough challenges they face. Find out what they had to say about the effectiveness of management, e-commerce, being in demand and budgeting issues. Download the RealPlayer plug-in for free, and you can listen to their insight. **DocFinder: 9024**

Your salary

- Let's face it, it's hard to come up with a nice round figure when you head in for salary review. With our salary calculator, you can make an informed raise request. Plug in your demographics, including age, education and region, and find out what you should be making. **DocFinder: 9023**

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COONEY'S CORNER

The best of the NetFlash daily newsletter

Equant expands voice-over-IP service

Equant last week announced it now supports off-net voice-over-IP calls for multinational business customers. The service provider can terminate calls in 220 countries and originate calls in 54 countries, it says. Equant has deployed five Cisco AS5300 Universal Access Servers throughout its network to hand off calls from Equant customers to the public switched telephone network. **DocFinder: 9147**

IBM updates supercomputer for business

IBM this week will introduce the RS/6000 supercomputer that will handle complex tasks faster than before. The AIX-based RS/6000 SP is best known as the computer that foiled chess master Garry Kasparov in a much-publicized set of matches years ago. This new system, dubbed "ASCI White," is a 512-node supercomputer capable of 12.3 trillion operations per second, making it 1,000 times more powerful than the Deep Blue computer that tangled with Kasparov. **DocFinder: 9149**

Microsoft scrambling to fix new Outlook security hole

Is it just me or do these guys have more holes than Swiss cheese? Microsoft is once again scrambling to fix a newly discovered vulnerability in its software that security experts warn is every bit as dangerous as an earlier one, for which a workaround was posted less than a week ago. The latest hole involves Microsoft Outlook and Outlook Express e-mail clients. The buffer overrun vulnerability — which initially was discovered by an Argentinian security firm — lets crackers launch an attack via the popular Internet e-mail software without victims having to do a thing to initiate it and infect their systems. **DocFinder: 9151**

— *Michael Cooney, associate news editor*

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COLUMNISTS

Water Cooler

Affordable education

Features Managing Editor Amy Schurr tells you how you can set your own price for Cisco, Lotus, Microsoft and Novell instructor-led training. **DocFinder: 9137**

The Bleeding Edge

Voice vote

If you're tired of hearing about voice over DSL, TeleChoice's Daniel Briere and Beth Gage have a new voice technology for you: voice-enabled DSL. **DocFinder: 9138**

Keeping Current

Begging for dollars

Forget "Survivor" and "Big Brother." Fred McClimans says the voyeur show to watch would involve start-ups working around the clock to get their businesses off the ground. Now that would be Must-See TV. **DocFinder: 9139**

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NEWS BRIEFS, JULY 24, 2000

RBOC, CLEC battle drags on

A key issue in the struggle between regional Bell operating companies and competitive local exchange carriers (CLEC) will probably linger for years, despite a federal court ruling last week. The 8th District Court says the RBOCs don't have to discount prices when they lease pieces of their network to competitors; they can charge what those network elements cost. That is good news for the RBOCs. But the same ruling says that when they figure the costs, they can't include the original investment they made in those elements, which include the phone lines that connect customers to carrier switching offices that CLECs use to support DSL services. If the ruling stands, it will take months to figure out state by state whether RBOCs will charge more or less for these network elements as a result. The ruling is likely to be appealed to the U.S. Supreme Court, which could add another year to the process.

SCO fumbling Linux ball?

The Santa Cruz Operation (SCO) appears to be stumbling in its plans to release its own Linux distribution amid rumors that the company plans to sell off its Unix products division.

Last week a published report stated that SCO's UnixWare line of software will be sold to Caldera Systems, a Linux vendor, for about $70 million in stock. SCO labeled the report a rumor. The company has also repeatedly declined to comment on what the status of its own Linux flavor is after leaking word of the product plans in June (www.nwfusion.com, DocFinder: 9148). Over the past year, the firm, the leading supplier of Unix software, has seen falling revenue in the face of stiff competition from Windows NT and Linux.

Foundry can't win for winning

Foundry Networks' stock dove 34% last week despite the company reporting second-quarter earnings that exceeded Wall Street expectations. The problem was that Foundry's bang-up quarter followed Juniper's and Alteon's quarters, in which they annihilated expectations. Foundry's second-quarter revenue grew 27% on a sequential basis and earnings came in $.03 per share higher than the Street expected. Meanwhile, Juniper recently posted sequential revenue growth of 77% and Alteon recorded an 82% rise in sales. Foundry rival Extreme's stock rose almost 28% last Thursday after several "buy" recommendations from analysts following a stellar fourth quarter.

Optimal acquisition for Compuware

Compuware this week is expected to announce the buyout of Optimal Networks, a maker of application performance monitoring software. Compuware plans to add that technology to its lineup of EcoSystems network modeling software, which includes capacity and analysis tools. With this buyout, Compuware claims it will now be able to let companies troubleshoot performance problems for applications, servers and networks both before deployment and when in production.

Microsoft patches, again

Microsoft last week released a patch to correct what many critics consider one of the most dangerous holes ever found in Outlook. The buffer overrun vulnerability in Outlook, which affects all versions of the software, allows malicious code to be loaded onto a PC and executed when a user simply tries to download mail using POP3 or IMAP4 protocols. Outlook clients configured to use only MAPI, including most enterprise clients using Exchange Server, are not affected. Regardless, Microsoft is recommending that all Outlook users install the patch, which is available at www.microsoft.com/windows/ie/download/critical/patch9.htm.

Former UUNET CEO joins start-up

SiteSmith, a Santa Clara start-up in the hot outsourced Internet site operations area, scored a major coup last week by signing on Mark Spagnolo as president, CEO and chairman of the board. Spagnolo was formerly president and CEO at UUNET. Spagnolo says he joined 7-month-old SiteSmith because he thinks the site operations market is poised to take off in "rocket ship"-style growth and because he wanted the experience of building a young company.

Spagnolo signs on to SiteSmith: "I think it's going to be a blast," says the former UUNET CEO.

"I think it's going to be a blast," Spagnolo says of the SiteSmith opportunity. Of course, stock options may have helped persuade Spagnolo,too. SiteSmith has raised $24 million in venture capital and previously announced plans to go public later this year.

Guilty verdict set aside in net saboteur case

BY SHARON GAUDIN

NEWARK, N.J. — A U.S. District Court judge has set aside the guilty verdict in the case of a former network administrator who had been convicted in May in the first prosecution of computer sabotage.

Timothy Lloyd, 37, of Wilmington, Del., was found guilty of planting a software time bomb in a centralized file server at Omega Engineering's Bridgeport, N.J., manufacturing plant. The malicious software code destroyed the programs that ran the company's manufacturing machines, costing Omega more than $10 million in losses, $2 million in reprogramming costs and eventually leading to 80 layoffs.

Judge William Walls, who presided over the four-week trial, handed down the decision July 14 after one of the jurors who heard the case approached the court with concerns days after the guilty verdict had been handed in.

The juror told the judge she was unsure whether a piece of information she heard on the television news had been factored into her verdict, according to Assistant U.S. Attorney V. Grady O'Malley, who prosecuted the case. "Although she couldn't articulate what impact it had, she simply made the statement that she was unsure about whether it was important to bring to the court's attention," O'Malley says.

Walls, who did not write an opinion on the decision, called the information prejudicial. The judge declined to comment on an open case.

O'Malley, who said he was "puzzled" by Walls' decision, says the U.S.Attorney's Office is appealing the decision to the Third Circuit Court of Appeals, in part because the juror did not receive the information improperly. He says it was not discussed during deliberations, it was not related to the case and the judge had instructed the jury to base its deliberations solely on evidence presented in trial.

O'Malley says if the appeal fails, he will retry the case.

"It had nothing to do with the evidence in the case," O'Malley says. "It had nothing to do with how the government presented its case.... This had to do with an extraneous piece of information that one juror seemed to focus on after the verdict came in. You can't go behind the deliberation process. If that were the case, no verdict would be safe."

Edward Crisonino, one of Lloyd's two defense attorneys, says what the juror heard on the news had "nothing to do with the case," but might have factored into her thinking.

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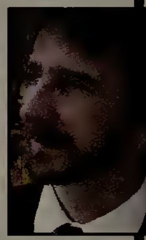
COUNT-DOWN TO SABOTAGE

Learn the sequence of events that led to the jury's verdict of guilty in the Timothy Lloyd computer sabotage case.



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Crisonino says Lloyd was relieved. "He would definitely like to have this over, but if it means not going to prison, I'm sure he'll wait another year," Crisonino says. "This is less frustrating than prison."

The Lloyd case was the first federal criminal prosecution of computer sabotage. Industry observers hailed the conviction as a precedent-setting victory, proving that the government is capable of tracking down and prosecuting computer crime.

Lloyd has maintained his innocence. "There's no way in the world I did this," he said in an interview after the verdict was handed down in May.

If the guilty verdict is re-engaged, Lloyd will face up to five years in federal prison. ◪

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Web having huge impact on call centers

BY ELLEN MESSMER

CHICAGO — The traditional 800-number call center, a bustling place where customer service representatives handle inquiries as fast as possible over the phone, is adapting to the demands of doing business on the Web.

The CSRs, as the service agents are called, are no longer asked to only take customer phone calls. Now, they may also conduct Web-based chat sessions with customers, browse with them on the Web, or prepare responses to incoming e-mail about the products or services their corporation markets.

In many cases, it's leading to a radical reassessment of the call center's role, which the corporate bean counter has long viewed as a cost burden. For a decade, the goal was to get the CSR off the phone with the customer as quickly as possible. Now, there's the growing notion that these transformed call centers, often referred to as customer contact centers, can boost sales and cement customer loyalty through more personalized service.

"It's a great opportunity for companies," said Don Van Doren, president of Vanguard Communications, a consultancy in Morris Plains, N.J., that advises call-center operations.

Van Doren, who made his remarks at the Web-enabled Customer Contact Centers conference in Chicago last week, said this online interaction is particularly important with the "high-value" big spender every business wants to keep.

At Merrill Lynch, phone/Web customer-contact centers are critical to its online trading and financial services businesses. "Our call center has been transformed from a cost center to a profit center, an information vehicle to a customer-relationship channel," says Michael Adornetto, director of the financial firm's client contact technology services.

Merrill Lynch has three contact centers based on Genesys software around the U.S. where 600 CSRs can access an immediate view of the customer record at their computers after the customer has entered a secret code into an interactive voice-response system when placing a call to Merrill Lynch.

The CSRs at these contact centers do more than talk. They also have access to the Web to point customers toward information and they respond to e-mail — though some automated e-mail response is also used.

Judy Nelson, Merrill Lynch's director of direct and interactive financial services, notes that the changes have meant more challenges in finding and training the right kind of CSR.

"It's expensive to bring [CSRs] on board and train them," says Nelson, who said Merrill Lynch has punched up its effort to recognize and reward CSR talent.

For CSRs, the Web does seem to be boosting their image inside corporations. Frequently viewed as faceless robots urged to keep contact with customers short, the Web-savvy CSR is now being viewed more as a sales agent deserving commissions.

At 1-800-Flowers, which has expanded beyond flowers into other gifts, CSRs have to handle four interactive chat sessions at the same time, says Connie Adcock, vice president of customer services responsible for the firm's six centers, which house a total of 1,000 customer agents.

These agents also take calls and answer e-mail. 1-800-Flowers uses Kana Communications software to manage e-mail and eShare Technologies software for interactive chat.

"Customers want human assistance on the Web, but our customers' expectations have changed — they want everything in dot-com time," Adcock says. ◪

Company costs for assisting customers

Systems that don't require a human being, such as IVR, automated e-mail or searchable "frequently asked questions" on the Web, are the cheapest.

- Automated-response e-mail: 25 cents per incident
- Knowledge-based Web self-service: $1
- Interactive voice response: $6
- Online chat: $8
- E-mail from agent: $3 to $10
- Telephone with customer agent: $10 to $33

SOURCE FORRESTER RESEARCH, CAMBRIDGE, MASS; GIGA INFORMATION GROUP, CAMBRIDGE, MASS.

IBM eyes e-comm apps with new mainframe

BY MARC SONGINI

ARMONK, N.Y. — IBM will soon significantly bulk up its mainframe software and hardware to better handle massive e-business Web sites.

While many details remain sketchy, in a briefing with *Network World* last week IBM executives detailed new plans for the next-generation S/390 mainframe machine, dubbed Freeway, which will have 64-bit CPUs — double the size of CPUs on IBM's current high-capacity boxes. The Freeway boxes may go to market under the name G7.

Also coming is a new iteration of the mainframe's operating system, OS/390 Version 2 Release 10, optimized to run on the Freeway architecture. It will support quality-of-service (QoS) features for key users or workgroups in a network, and give mainframe shops more extensive security, Java monitoring and storage capabilities. Release 10 will also have improved mainframe cluster — or sysplex in IBM parlance — management support to make sure key users or workgroups get priority access to network applications.

Facing stagnating growth for its traditional mainframe cash cow, IBM is hoping Freeway will attract enterprise and ISP customers needing industrial-strength e-commerce servers. Indeed, in its annual report, the firm says server revenue, which includes S/390 numbers, declined 17.9% in 1999. Recently, CEO Louis Gerstner expressed his expectations about Freeway, saying it will be able to execute "very, very sophisticated load balancing to handle huge business workloads with unpredictable peaks."

Included in OS/390 Version 2 Release 10 will be an enhanced Workload Manager, the software program that controls access to mainframe cluster applications.

Based on QoS policies written by IS staff, Workload Manager will be able to prioritize sessions for key users communicating with the mainframe based on their IP addresses, directing them to the least busy IP stack in the sysplex, as needed.

These changes will assist companies in upholding service-level agreements, says Jerrie Stewart, product manager for OS/390. Previously, Workload Manager could only prioritize applications, and was unable to create different classes of service based on IP addresses.

Additional enhancements include the ability to monitor traffic coming into a sysplex and

See **IBM**, page 14

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For the answer to this week's question and more net trivia, visit **Network World Fusion** and enter **2349** in the Search box.

This week's question:
Which user organization was formed in 1948 by Walter Young, Shell Oil's manager of communications?

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WorldCom bolsters international network services

BY DENISE PAPPALARDO

WorldCom is planting new stakes in foreign soil as it expands its ATM, frame relay and private-line networks.

By the end of 2000, WorldCom will offer ATM services in 22 countries, frame relay in 44 and dedicated private line in 26, says Jim DeMerlis, vice president of product marketing at WorldCom. At the end of last year, WorldCom was offering ATM services in 13 countries, frame relay in 22 and dedicated private line in 19.

WorldCom's international data network expansion is part of the company's $7 billion attempt to expand its data, fixed wireless and Internet networks this year. The company's international expansion will let business users buy data services that run over the WorldCom fiber-optic network in more than 44 countries.

"Owning your own local and long-haul infrastructure is a key advantage for service providers and end users," says Joanne Makris, a program manager at Boston consulting firm The Yankee Group. Business users can expect more stringent service-level guarantees from providers that own fiber networks, she says, because ownership eliminates service providers' dependency on local phone companies or post, telegraph and telephone administrations to determine network performance.

"Our strategy is to build our own networks overseas and not be reliant on alliances or agreements with third parties," DeMerlis says. WorldCom will offer the same data and voice services it offers in the U.S. to customers overseas, he adds. The company is especially focusing on integrated services such as its OnNet offering, which lets business users send voice and data traffic over a single connection.

WorldCom is deploying Lucent's B-STDX Multiservice Frame Relay switches and Cisco's BPX ATM switches throughout its international networks. But DeMerlis would not quantify how many switches are being deployed this year.

WorldCom has a leg up on some domestic competitors, such as AT&T and Sprint, because it owns fiber networks in many countries. AT&T has a solid alliance with British Telecom, which may prove very successful over time, The Yankee Group's Makris says. And Sprint is now trying to build its own international nets overseas since it separated from the Global One joint venture.

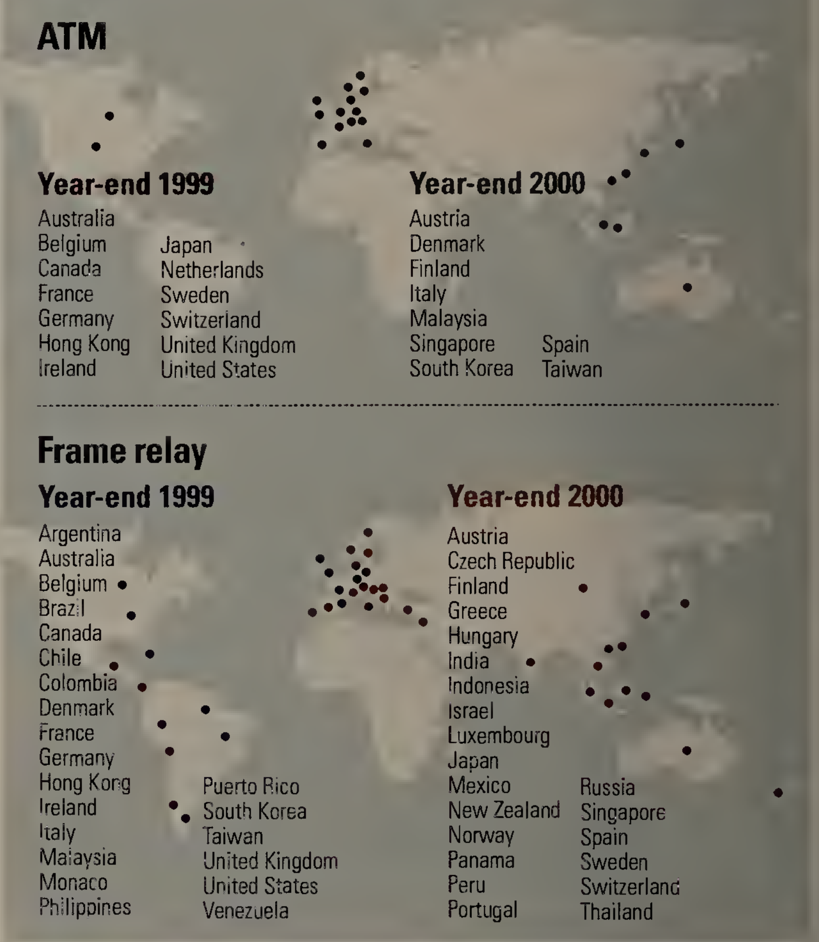
But WorldCom still has to compete with multinational service providers, such as Equant and Infonet, which today have a greater geographic reach. In fact, Equant has been offering its customers integrated voice and data over IP services in 54 countries since March. Equant enhanced the service last week by announcing support for voice calls that terminate on the public switched telephone network (see www.nwfusion.com, DocFinder: 9147).

WorldCom's international expansion is expected to be complete by year-end with integration services to soon follow, DeMerlis says.

WorldCom: www.wcom.com

WorldCom's ocean crossings

WorldCom's network push will result in more data network service availability overseas. Here's a map of where WorldCom offers service today and where it will offer service by year-end:



ATM

Year-end 1999

Australia
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Canada
France
Germany
Hong Kong
Ireland
Japan
Netherlands
Sweden
Switzerland
United Kingdom
United States

Year-end 2000

Austria
Denmark
Finland
Italy
Malaysia
Singapore
South Korea
Spain
Taiwan

Frame relay

Year-end 1999

Argentina
Australia
Belgium
Brazil
Canada
Chile
Colombia
Denmark
France
Germany
Hong Kong
Ireland
Italy
Malaysia
Monaco
Philippines
Puerto Rico
South Korea
Taiwan
United Kingdom
United States
Venezuela

Year-end 2000

Austria
Czech Republic
Finland
Greece
Hungary
India
Indonesia
Israel
Luxembourg
Japan
Mexico
New Zealand
Norway
Panama
Peru
Portugal
Russia
Singapore
Spain
Sweden
Switzerland
Thailand

Service offers one number for many phones

BY TIM GREENE

SEATTLE — Start-up SimulRing claims it can provide a phone service that tracks you down wherever you are faster than other follow-me phone services.

With Simultaneous Ring service, each customer is assigned a phone number, and whenever he gets an incoming call, SimulRing's network automatically dials all phone numbers where he might be reached, all at the same time. When the customer answers one phone, SimulRing drops the calls to the other numbers. If the customer doesn't answer after three rings, calls go to voice mail.

Similar phone services, such as MCI's One Number, call customers' numbers one after another. That forces callers to stay on the line until each number is dialed, rings and goes unanswered; until someone picks up; or the list of numbers is exhausted and the call goes to voice mail.

SimulRing's attempts to call customers' designated lists of phone numbers add just 200 msec to the call set-up time, says CEO Rob Meldrum.

The Simultaneous Ring service also lets customers pick from a wider range of carriers, says Jim Ange, business development director for Lucent, who uses the service. If he changes his cell phone service, for example, he can key his new cell number into his SimulRing profile, and he keeps the same SimulRing phone number.

SimulRing customers add and delete numbers where they might be reached on a secure Web site they can contact via the Internet using a PC or Wireless Application Protocol-enabled devices.

When the service is offered in a city, customers get local phone numbers as their Simultaneous Ring numbers. They can then associate that number with any other numbers where they might be found. If customers have a phone outside the SimulRing local calling area, they pay 9 cents per minute extra for calls received there.

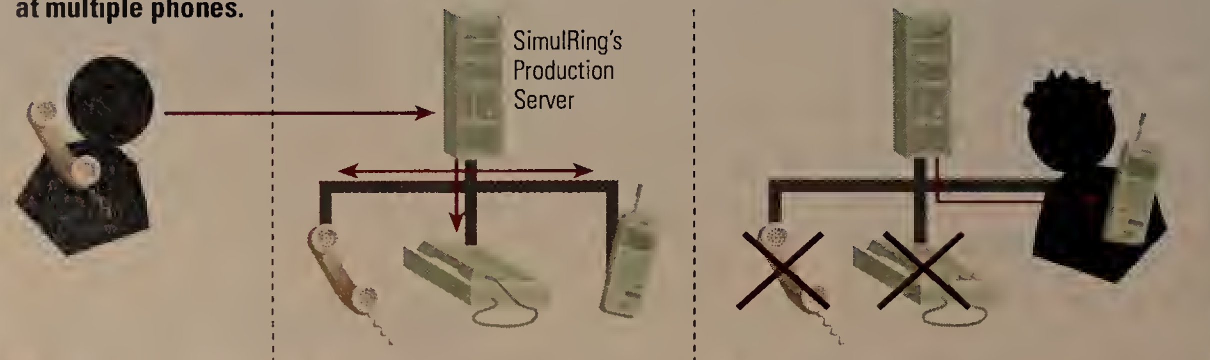
For $9.95 per month, customers get a Simultaneous Ring phone number and the right to associate it with three other numbers. They can add more numbers for $2 per month each. If they want a number ending in 0 or with repeating digits such as 2828, they pay $5 extra. For a number ending in 00, they pay $24.95. The one-time start-up fee is $29.95. Large corporations buying in bulk can negotiate discounts.

The service will be introduced in Seattle this week, and will roll out to about 50 cities by year-end and 100 cities by the end of 2001.

SimulRing: www.simulring.com

How Simultaneous Ring works

SimulRing's service issues each customer a single phone number that callers use to reach them at multiple phones.



❶ Caller dials SimulRing number.

❷ SimulRing's Production Server calls the customer's designated list of phone numbers all at the same time.

❸ Customer answers one phone, and calls to the other phones are dropped.

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IETF,

continued from page 1

denial-of-service attacks inside a far-flung corporate network built on Internet standards.

"Itrace is a pretty important initiative," says John Pescatore, research director for network security at Gartner Group, a Stamford, Conn., market research firm. "What we need are standard mechanisms that can be built into the Internet switching infrastructure. That's the only place it will work to stop distributed denial-of-service attacks."

One drawback of itrace is it identifies the machines that are sending a denial-of-service attack — not the hacker who programmed them. Therefore, itrace will not help law enforcement officials trying to catch and prosecute hackers.

Itrace also faces a deployment challenge because it becomes effective only after the technology is installed across the Internet's backbone and edge routers. In the best-case scenario, the itrace roll-out will take 18 months.

Nonetheless, itrace is the most promising technology that the Internet engineering community has conceived for battling denial-of-service attacks.

"The ISPs don't have good tools to trace these kinds of attacks back today. That's what we're trying to do," says Steve Bellovin, a network security researcher at AT&T Labs who is heading the IETF effort. "Itrace will be quite helpful, but I don't think it's a panacea. What you really want to do is deal with the attacks and stop them from hurting you."

In a distributed denial-of-service attack, a hacker breaks into other people's servers and programs them to flood a Web site with massive amounts of bogus traffic until the Web site crashes. In the much-publicized February attacks, it took Web site operators and their ISPs several hours to thwart the attacks and get sites back up and running.

One of the reasons it takes so long to stop a denial-of-service attack is the hacker sends the bogus traffic using fake IP addresses. Itrace would let Web site operators and ISPs track denial-of-service attacks back to their true sources within minutes.

With itrace, routers randomly generate a traceback message about a packet and send it to the packet's destination. Each traceback message provides information about the packet being traced, what time it was sent, where it came from, where it went and authentication of the packet transfer.

Network managers can piece the traceback messages together into a chain that represents a packet's path through the Internet. This capability is important because a packet takes as many as 20 hops through routers at various ISP locations as it moves through the Internet from sender to recipient.

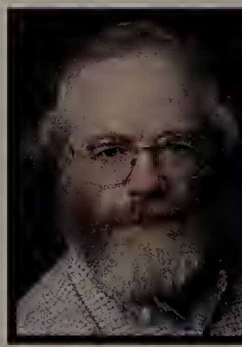
Because the traceback messages are sent at a rate of one out of every 20,000 packets, they won't have a significant impact on the performance of the router or the Internet overall. However, with enough traceback messages from enough routers along the path, a network manager can find the source of a large amount of illegitimate traffic.

One disadvantage of itrace is it stores information in the traceback messages in compressed form, so the information is ambiguous and requires some analysis and guesswork, says Fred Baker, chair of the IETF. "Due to this ambiguity, itrace is not a silver bullet. But it gives us a clue, where right now we are often completely in the dark."

The main challenge for itrace is getting router vendors to support it and ISPs to deploy it. One question is whether ISPs will deploy it just on their border routers or on all the routers in their networks. The latter approach is better because itrace is more helpful if it is deployed on more routers.

"Nobody can compel the ISPs to deploy this," AT&T Labs' Bellovin says. "The goal is to produce a specification that has support from router vendors such as Cisco and Juniper and from the ISPs."

ISPs face the cost of upgrading their routers to support itrace, and also the cost of developing the public-key infrastructure required for traceback message authentication. Without fail-proof authentication, hackers can create bogus traceback messages to accompany their denial-of-service attacks.



ISPs don't have good tools to trace denial-of-service attacks, says AT&T Labs' Steve Bellovin.

Still, ISPs seem positive about the itrace approach. "The ISP industry is going to welcome any attempt to standardize tools that help customers fight against distributed denial-of-service attacks," says Mark McFadden, chief technology officer for the Commercial Internet Exchange Association.

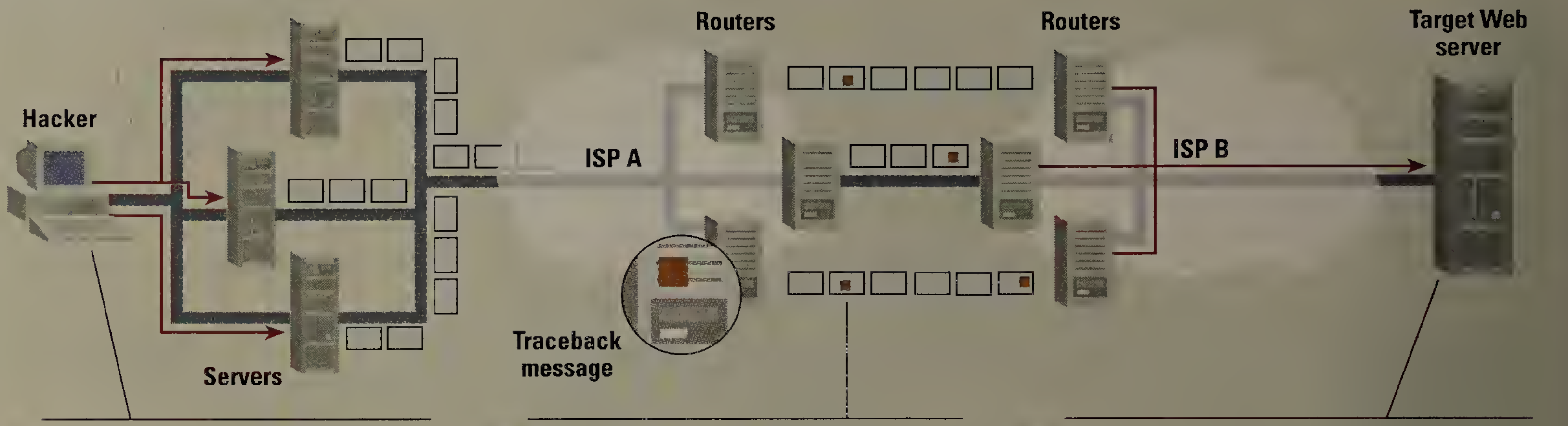
McFadden says the ISP industry also needs tools that detect and identify denial-of-service attacks, vs. sudden, large flows of legitimate traffic.

"Itrace is one part of a solution toward distributed denial-of-service attacks," says Stefan Savage, an assistant computer science professor at the University of California at San Diego who has developed an alternative packet traceback technique. "There's a whole host of tools that you need to detect attacks, trace them back and perform countermeasures. Tracing back alone doesn't solve the problem."

The itrace working group is the IETF's first attempt at addressing denial-of-service attacks. The idea for itrace dates back to January, when a group of network security researchers from Cisco, Nortel, Lucent, UUNET and AT&T began developing a traceback methodology that would scale across the Internet. ■

How ICMP Traceback Messages work

The IETF's traceback technology — nicknamed itrace -- would let network managers discover the path that packets have taken through the Internet, a capability that is important for dealing with denial-of-service attacks in which the source IP address is forged. Here is an example of how itrace would work:



① A hacker sends a distributed denial-of-service attack to a target Web site. In this type of attack, a hacker breaks into other people's servers and installs traffic-generating software. The hacker then triggers these machines to start flooding the target Web site with massive amounts of traffic.

② Itrace would be deployed in the edge and backbone routers in the Internet. These routers would randomly generate traceback messages and send them along with packets to their destinations. A traceback message provides information about the packet being traced, what time it was sent, where it came from, where it went and authentication of the packet transfer.

③ During the attack, each originating computer would send a flood of packets via ISP A, whose router would send along a traceback message with one of the packets to ISP B, and so on until the packets reach the target Web site. A network manager could use the traceback messages to discover the hops the packets had taken until the originating servers were found.

IBM,

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detect any irregular patterns in the flow of network traffic, such as excessive use by a single user. Another feature will automatically restart crashed virtual machines in a sysplex and reroute sessions around them — a procedure that is done manually today.

The ability to implement such QoS features is crucial, says Bill O'Donnell, a senior IS consultant with the State of Wisconsin's mainframe-based information technology services department in Madison. If for some reason a processor on a mainframe reaches peak capacity, O'Donnell immediately needs to be able to decide who gets access to resources and who can wait.

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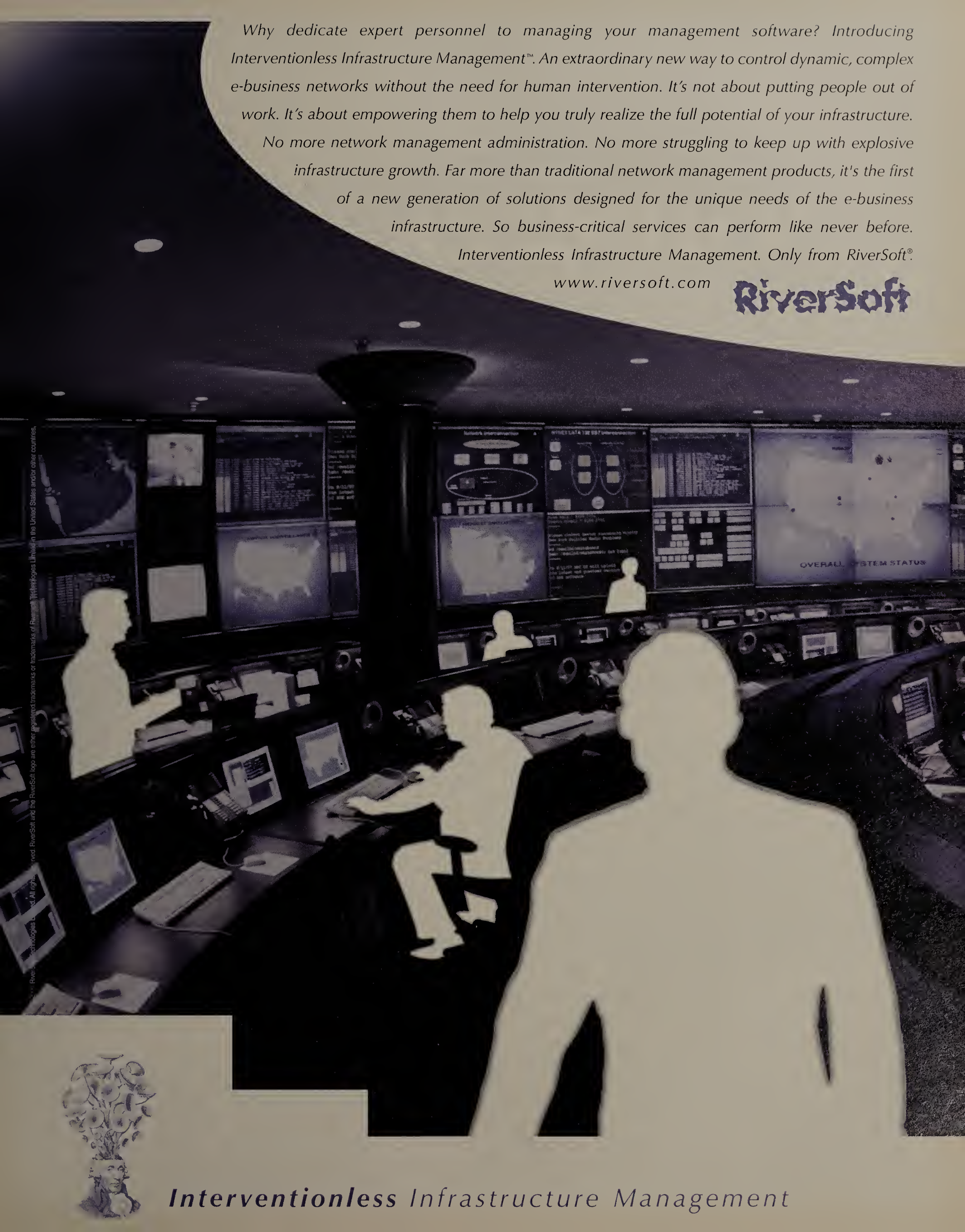
IBM's Gerstner expects new mainframes to handle tons of e-biz transactions.

Also coming in Release 10 will be the ability to directly monitor the performance of Java applications running on the mainframe. Previously, Java statistics had to be collected in a database and observed there, O'Donnell says.

IBM's Stewart also says OS/390 will now support Kerberos, a standard 'Net authentication and authorization mechanism. This permits network or Internetwide authentication and authorization regardless of the network operating system.

The next-generation Freeway machine will be available before year's end; OS/390 Version 2 Release 10 will be available at the end of September. Upgrades will be free to users of previous releases of Version 2.

IBM: www.ibm.com



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Nortel,
continued from page 1

explaining the rationale behind the $9.1 billion union. "The IP component is growing more like 70% per year. That's really the segment we're focusing on."

But Nortel's IP business, specifically in routers and Layer 3 switches, has failed to increase its market share. The company confirmed last week that after a significant delay, it will not ship the 240G bit/sec Versalar 25000 router for the Internet core as a stand-alone product. It's been "folded" into the OPTera Packet Core, the cornerstone of Nortel's product portfolio for merging packet and optical networks.

In the enterprise, Nortel has upheld Bay's tradition of losing market share to Cisco in high-end routers. Nortel's share in this market fell from 15.7% in 1998 to 11.2% in 1999, while Cisco's share increased 5.5%, according to The Dell'Oro Group in Portola Valley, Calif.

In Layer 3 switching, which was another Bay stronghold, Nortel's dive has been even more dramatic. Nortel lost its market leadership and more than half of its market share between 1998 and 1999, according to Dell'Oro — from 37.8% to 17%, a drop of almost 21 percentage points. Nortel also delayed the introduction of its next-generation Layer 3 switch by three quarters.

Cisco again was the chief beneficiary of Nortel's precipitous fall, gaining 26.2 percentage points between 1998 and 1999, according to Dell'Oro.

As Nortel marks the second anniversary of its Bay acquisition next month, the telecom giant seems to be anything but an IP company. Indeed, Nortel appears to be losing its grip on IP and having little to show for its $9.1 billion investment.

"In this space they have missed it," says Frank Dzubeck, president of consultancy Communications Network Architects in Washington, D.C., referring to IP routing and switching. "They are falling behind tremendously in everything but optics."

How did it happen?

Along with Cisco, 3Com and Cabletron, Bay was one of the prestigious "Big Four" in enterprise data networking, a handful of multibillion-dollar companies that accounted for more than 80% of the hub, switch and router market. Bay was created by the 1994 marriage of two leading internetworking vendors: SynOptics in shared-media Ethernet hubs and Layer 2 switches, and Wellfleet, the No. 2 router vendor — albeit a distant No. 2 — behind Cisco, the company that invented routers.

Bay's fortunes in routing began to sag long before Nortel entered the picture. The company steadily lost market share to Cisco for most of the 1990s, and lost half its share between 1996 and 1999, according to Dell'Oro.

Enter the Layer 3 switches

Part of that decline had to do with the emergence of Layer 3 switches, a cost-effective, high-performance hardware-based collapsed backbone alternative to routers. Bay, though, was quick to pounce on the opportunity by snatching up Gigabit Ethernet start-up Rapid City in June 1997, and Bay's dexterity quickly earned it the leadership position in this burgeoning market.

But Nortel's acquisition of Bay changed all that. Bay and Rapid City engineers who were used to working at a nimble, fast-moving company with a start-up's pace, fled the buttoned-down, bureaucratic Nortel. This, along with the distraction of integrating its $9.1 billion prize into the corporate fold, crippled Nortel's ability to maintain — let alone build on — its market leadership in Layer 3 switching.

The result was the plunge in Layer 3 market share from 1998 to 1999, and Cisco's dramatic gain.

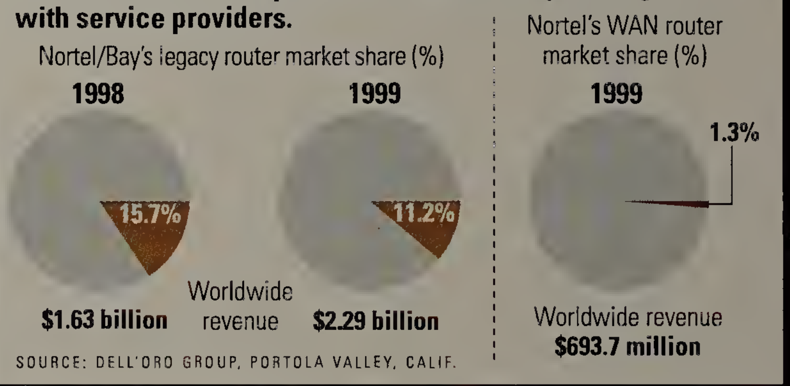
> **■ *"Nortel really needs to get in gear and really start touting its wares and delivering product that moves [the company] into this next-generation network."***
>
> Eric Thompson, principal analyst, Dataquest

"I don't think [the Bay acquisition] was a bust, but it seems like the traditional voice companies are having a harder time transitioning to packet-based than companies like the Ciscos are transitioning to voice," says Eric Thompson, principal analyst at Dataquest. "Nortel really needs to get in gear and really start touting its wares and delivering product that moves [the company] into this next-generation network."

The Layer 3 switch numbers don't tell the whole story, says Arun Jain, director of IP infrastructure solutions at Nortel, who joined the company with the Bay acquisition.

The incredible shrinking router market share

Nortel has been continuing Bay's tradition of losing router market share in enterprise nets, while barely making a dent with service providers.



SOURCE: DELL'ORO GROUP, PORTOLA VALLEY, CALIF.

"Our market share percentage has gone down, but it was obscenely high because we were the first one to come out," he says. "Over time, although our percentage has come down, our business has grown significantly."

That it has. Even though Nortel lost more than 50% of its share of the Layer 3 switch market between 1998 and 1999, revenue rose 50%, from $234.3 million to $351.1 million, according to Dell'Oro. But virtually everyone grew by at least that much as the worldwide market for Layer 3 switches ballooned from $620.2 million in 1998 to $2 billion last year.

Even 3Com, which recently discontinued its Layer 3 switches for the core of large companies, increased its revenue by about 8.5%.

Nortel did not help itself last year — or the first half of this year — by delaying the release of its next-generation Layer 3 switch by nine months. The Passport 8600 is the follow-up to the Accelar 1000 line, which was the first-generation Rapid City product.

The Passport 8600, initially intended for an October 1999 debut, began shipping in June. Nortel officials said they delayed the switch to get it right. Widener University in Chester, Pa., which recently awarded Nortel a multimillion-dollar contract to replace a 3Com network with 8600s, concurs with that (www.nwfusion.com, DocFinder 8845).

"We expect that business to start growing significantly again," Jain says.

Routing may be another story. As the market for enterprise routers was evaporating for everyone but Cisco in the mid-1990s, a robust demand for routers was germinating in the service provider market, due to the commercialization and growth of the Internet and the deregulation of the telecom industry in 1996. These two events served as the impetus for Nortel's acquisition of Bay.

But the cancellation of the Versalar 25000 — which was based on a product obtained from Bay — confirms that Nortel has gotten off on the wrong foot in service provider routing. Nortel scuttled plans last year to resell a terabit router from start-up Avici Systems, in which it has a 20% stake.

Nortel may be a player in Internet core routing, but not in Internet core routers.

"When the Versalar 25000 was going to come out to market toward the end of this year, we didn't think it would get us a leading position," Jain says, explaining the rationale for folding the product. The Versalar 25000 was supposed to ship late last year. "It had a proposition that was very strong, but we would have been at best a No. 3 player."

According to Dell'Oro, Nortel had a minuscule 1.3% of the nearly $694 million market for WAN routers in 1999, due largely to the Versalar 15000 edge router — another product with Bay roots — and the Shasta 5000 Broadband Service Node, which was obtained via acquisition. Nortel is well behind Cisco's 78.7% share and Juniper Networks at 14.8%.

Indeed, observers consider WAN routing to be a two-horse race between Cisco and Juniper even though Dell'Oro currently counts about 23 players — many of them start-ups — in the market.

Nortel merged Versalar 25000 processor and software technology into the OPTera Packet Core, a switch fabric that transports IP, ATM and SONET traffic, and serves as the interface between the packet network and the optical network. OPTera Packet Core is a component of Nortel's OPTera Packet Solution (OPS), a five-product package designed to meld packet and optical networks into a high-performance multiservice infrastructure for the Internet core.

OPS will ship next year, Jain says.

"A lot of the key technologies in terms of both software and processors from the Versalar are being merged in the OPTera Packet Core," Jain says. "We have an IP/optical play where we believe we can get a leadership position."

Analysts had high hopes for the Versalar 25000.

"It is an integral part of their whole OPTera proposition," says Ron Westfall, an analyst at CurrentAnalysis in Sterling, Va. "Without it, it's a gaping hole in their ability to execute on that particular proposition."

Jain says the Versalar 25000 probably wasn't as integral as people thought, or as Nortel led them to believe.

"It was an edge or peripheral device to OPTera Packet Core," he says. "It was always intended that that edge or peripheral device could always be the Versalar 25000, or some other router from

See **Nortel**, page 73

Convergence

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FACE-OFF

Is wireless data for the enterprise ready for prime time?

Advocates point to lower costs and increased coverage; opponents cite lack of standards-based products.

YES BY IRA BRODSKY

It took years longer than proponents had hoped, but wireless data is ready for prime time. Within the last year, wireless data has become significantly less expensive, easier to implement and more powerful.

Mobile phone market growth has repeatedly blown past forecasts. Analysts now predict one billion mobile phone subscribers by 2003. That number is impressive, but it doesn't tell the whole story. Almost all of the growth is in digital mobile phones; there are already more than 300 million in use.

Firms that evaluated mobile data in the past will discover two big changes. It is no longer necessary to buy $500 radio modems; one device, typically costing $100 to $200, now serves as both mobile phone and radio modem.

There also has been a dramatic increase in wireless data coverage. A year ago, there were two nationwide mobile data networks in the U.S. (operated by Ardis and BellSouth Wireless Data), each with about 1,200 base stations. When Sprint PCS launched its Wireless Web service late last year, it switched on a network of more than 12,000 base stations.

Sure, everyone wants to grab onto the Internet's coattails. But the synergy between wireless data and the Internet is genuine. A few years ago, a company implementing wireless data could look forward to six to 18 months of custom software development. The host computer had its proprietary protocol, the mobile terminal ran MS-DOS and the radio network's protocol was unfathomable.

Thanks to the Internet, the pieces now run IP, including mobile phones and PDAs. Affordable, easy-to-use development tools are widely available. Instead of requiring months or years, new applications are being brought online within weeks.

Two other factors fuel the growth of wireless data. First, engineers used to think wireless was an inherently narrowband medium. Today, vendors are developing technologies promising speeds from 64K to 5M bit/sec.

Second, content for wireless devices is exploding. This is exciting stuff because wireless not only extends the Internet to everywhere business is conducted, it opens the floodgates to location-based services. Firms are enjoying the advantages of online package tracking. Soon, they will be able to better manage all field operations.

Wireless data solutions are not yet perfect. Getting data into and out of small devices can be a challenge. But clever solutions are popping up regularly. They may not satisfy all pundits, but they do provide firms with profound, competitive advantages.

Brodsky is president of Datacomm Research in Chesterfield, Mo. He can be reached at ibrodsky@datacommresearch.com.

NO BY JAMES KOBIELUS

OK, so we can access the Web over wireless connections from PDAs and data-capable cell phones. We can also send and receive e-mail with these same devices.

But let's not confuse the enthusiasm of early adopters with the stringent demands of the corporate mainstream. When we call an application or service enterprise-ready, we're placing significant requirements on it. Unfortunately, wireless data products and services don't meet those requirements — and won't until next year, at the earliest.

Chief among these prime time requirements is the need for standards-based, mature, interoperable products and services from diverse vendors. The principal set of standards for wireless data is Wireless Application Protocol (WAP), specifically Version 1.2. However, there are no WAP 1.2-compliant handsets on the market, and won't be until later this year.

Another critical enterprise requirement is end-to-end transactional security — an area where wireless data technologies in general, and WAP in particular, again come up short.

Can enterprise users authenticate themselves to back-end network applications from WAP clients? Not until WAP Identity Modules (WIM) — smart cards that store user private keys, digital certificates and digital signature algorithms — are commercially available, and not until client device manufacturers ship products that interface with WIMs. We're not going to see many WIMs on the market until later this year.

Firms cannot control granular access by WAP clients to corporate applications and data until vendors begin shipping policy-based authorization servers for the WAP market. Several vendors of extranet authorization products are developing WAP-oriented offerings, but there are none currently on the market.

Companies cannot provide end-to-end secure, encrypted channels between WAP clients and the servers they're trying to access until general availability of WAP 1.2-compliant handsets and WAP gateways that support WAP 1.2's Wireless Transport Layer Security (WTLS) protocol. Even when WTLS products are available, firms will still need to wrestle with the critical issue of whether to trust cellular service providers to manage WTLS-to-TLS security bridging. Many firms will want to bring that security gateway in-house, behind their firewalls, but cellular service providers may balk at giving up such an important service.

There are a host of other open issues, such as the lack of WAP-oriented public-key infrastructure products and robust WAP-to-Web content translation tools, that show wireless data to be a technology still in its infancy — and not ready for enterprise prime time.

Kobielus is an analyst with The Burton Group, an IT advisory service. He can be reached at jkobielus@tbg.com.

www.nwfusion.com

WHAT DO YOU

THINK?

Is wireless data for the enterprise ready for prime time? Continue the debate online with Datacomm Research's Ira Brodsky and The Burton Group's Jim Kobielus.

DocFinder find it 9123 online

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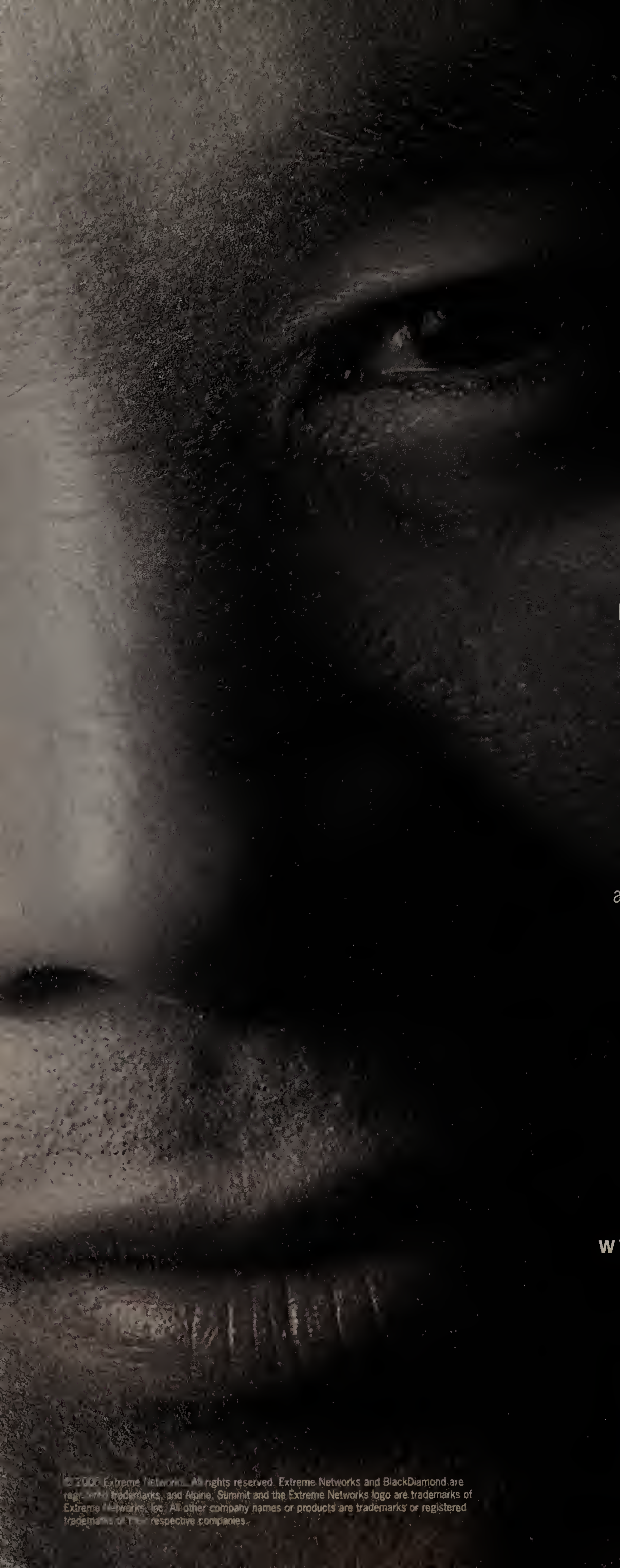

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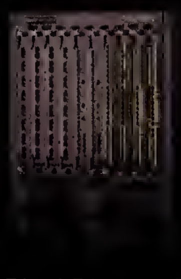

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Infrastructure

TCP/IP, LAN/WAN Switches, Routers, Hubs, Access Devices, Clients, Servers, Operating Systems, VPNs, Networked Storage

Briefs

Qualcomm last week said 3Com will bundle the wireless technology firm's Eudora e-mail program on CDs with 3Com's U.S. Robotics modems. The U.S. Robotics' logo will be displayed in the Eudora user interface. Qualcomm has seen more than one million downloads of this newest version of Eudora since it was commercially released in mid-February.

3Com: www.3com.com; Qualcomm: www.qualcomm.com

Benchmark Tape Systems last week introduced a new Digital Linear Tape drive, dubbed the DLT1.

The DLT1 has a capacity of 80G bytes compressed, 40G bytes uncompressed, and is available in two models. One model is external to the server; the other internal.

Dell will later announce that it will put the DLT1 in its PowerEdge 1300, 2400, 4400 and 6400 servers.

The internal model of the DLT1 is priced at $1,500; the external model costs $1,650.

Dataquest of Stamford, Conn., estimates that DLT drives have a $1.2 billion share of the $3.7 billion market, with a compound growth rate of 14%.

Benchmark: www.benchmarktape.com

Ezenia of Burlington, Mass., announced last week that it is adding a software-based multipoint control unit to its Encounter product line. The Encounter 1000 is used to connect multiple videoconferencing endpoints into a single conference with data-sharing capabilities. Priced at $3,995, the Encounter 1000 runs on Windows NT servers and comes with Web-based administration and scheduling capabilities.

Ezenia: www.ezenia.com

Intel router taps high-speed DSL

BY APRIL JACOBS

Intel aims to give small and midsize business users high-speed Internet access with a new router that can take advantage of traditional telephone lines to access high-speed DSL2 services (HDSL2).

The Express 9545 router lets users have access to 1.5M bit/sec services using the same copper wires used for telephone systems instead of installing dual copper pairs required by the older high-bit-rate digital subscriber line (HDSL) standard.

The router also includes the routing and DSU/CSU required for T-1 line Internet connections in a box — pieces that usually are installed separately by service providers at an end user's site.

William Hurley, an analyst with The Yankee Group in Boston, said Intel's router will serve as a cost-effective and simple high-speed Internet connection device for small and midsize businesses. Users can reap cost and performance benefits, he says, because the router works with existing telephone infrastructure and gives better performance than other options, such as dial-up connections.

The router works with HDSL2 access devices, such as concentrators and multiplexers from providers such as AccessLAN, Adtran, ADC/ParGain and Wetstel.

Anni Moeller, a product line manager for Intel, says in addition to letting users take advantage of their existing wiring, the router reaches distances of more than 2 miles, approximately twice the length of DSL technologies — increasing the number of users who can access the pipe.

The Express 9545 also supports the Embedded Operation Channel standard, as well as optional remote console features that let network professionals manage the device. Those features also let service providers that offer the box remotely install and configure the Express 9545, which reduces service costs.

The Express 9545 router from Intel supports the HDSL2 standard, allowing a single pair of copper wires to provide T-1 access.

The Express 9545 router is part of Intel's line of Express 8200 and 9500 routers, which are intended for Internet and branch-office access. Those devices have one or two WAN or LAN ports.

Intel is upgrading the Intel Express router software that runs those devices. The firmware is available free to current users. The Express 9545 is shipping now and costs $1,899.

Intel: www.intel.com

General Motors tests Ethernet on the factory floor

BY CAROLYN DUFFY MARSAN

General Motors last week launched a pilot project to test the viability of using standard Ethernet network gear and Internet communications protocols in automotive manufacturing.

The test will use TCP/IP running over Ethernet to link eight programmable logic controllers that oversee machinery used in body shop tooling. The controllers previously used a special-purpose industrial network protocol from Rockwell Automation called ControlNet. GM migrated ControlNet to the emerging EtherNet/IP standard, which was developed by Rockwell and several industrial automation groups.

Gary Workman, a staff development engineer at GM's Technical Center in Warren, Mich., says the project's goal is to collapse the three networks employed by GM's manufacturing lines — Ethernet at the IT level, ControlNet at the controller level and DeviceNet at the device level — into two networks.

"We want to get rid of ControlNet and just support two protocols," Workman says. "This should be a little easier to configure, and we expect indirect cost savings in running two network protocols vs. three."

He says the cost savings will come from stocking spare parts and training staff for only two network protocols. He also says GM can use its Ethernet-based diagnostic and design tools instead of buying tools specifically for ControlNet.

EtherNet/IP standard at a glance

What it is:	An industrial network standard that takes advantage of commercial Ethernet components for plant floor communications.
What it does:	Encapsulates messages from Rockwell's special purpose DeviceNet and ControlNet manufacturing networks to run over Ethernet and TCP/IP so no gateway is required.
Developer:	Open DeviceNet Vendor Association, led by Rockwell.
Release date:	Summer 2000
Product expected:	Fall 2000
Web site:	www.odva.org

If the project goes smoothly, Workman hopes to install EtherNet/IP on a production manufacturing line used to build the underbodies of vehicles.

"We hope that before the Christmas shutdown, we'll be able to reconfigure the networks on that line to get rid of ControlNet and just run EtherNet/IP for the first half of next year," Workman says. "Eventually, GM expects to be able to use EtherNet/IP quite extensively."

Open DeviceNet Vendor Association, a factory automation group with more than 300 corporate members, announced EtherNet/IP in March. The technology has the support of ControlNet International and the Industrial Ethernet Association.

EtherNet/IP lets manufacturing plants take advantage of inexpensive, commercial-grade Ethernet equipment to tie together industrial controllers and devices. It uses the application layer common to DeviceNet and ControlNet networks, and it encapsulates DeviceNet and ControlNet messages over Ethernet without gateways.

EtherNet/IP will be available free to product developers later this summer. The first EtherNet/IP-compliant products are due out this fall. ◪

StorageNetworks bolsters management software

BY DENI CONNOR

WALTHAM, MASS. — Storage service provider StorageNetworks Inc. is expected to announce today updated software that lets customers efficiently manage data storage located at SNI's storage points of presence.

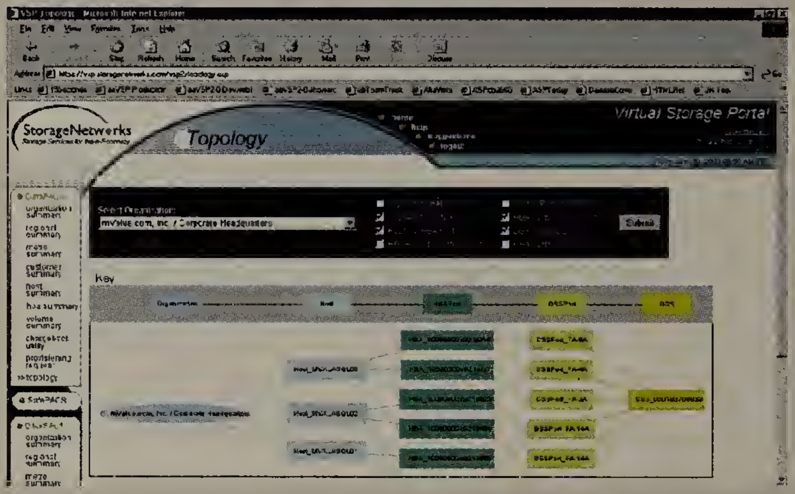
Virtual Storage Portal (VSP) Version 2.0 lets storage administrators monitor service-level agreements, obtain storage resources, request support and generate billing and chargeback reports based on storage usage. Administrators are able to monitor communication links between storage, performance and reliability.

Analyst firm Gartner Group of Stamford, Conn., estimates the market for storage providers will grow to more than $8 billion by 2003. With this revenue tied up in storage, it's necessary for customers to be able to monitor their storage use in real time, the company says. Customer storage allocation, replication and backup operations are also viewed remotely at SNI's Global Operations Center (GOC).

SNI added service status alerts and audit logs, near real-time event polling, multiple time zone reporting and a more secure logon process to the software, which can be launched from any industry browser. With a graphical view of their storage system architecture, SNI customers can view primary and backup data storage in addition to real-time data replication activity with the same application.

SNI's Virtual Storage Portal

In addition to monitoring storage utilization, VSP can display a logical and physical map of the customer's storage-area network.



"We use the VSP to give us daily graphs of usage, and show us host availability and backup status," says Patrick Laughran, chief technology officer for TechTarget.com in Dedham, Mass. TechTarget owns a portfolio of data and information-intensive Web sites for IT professionals, including searchstorage.com and searchwin2000.com.

"We do incremental and full backups of our data, and we can use the VSP to see if they were successful. If problems occur, we can notify SNI by submitting a change request that sends an e-mail to their service center. We can also use the VSP to determine if we need more storage," Laughran says. The company has 1.5 terabytes of storage managed by SNI, expecting that to double by year-end.

VSP is available now; SNI customers will be automatically updated at no cost.

StorageNetworks: www.storagenetworks.com

Tolly on Technology . Kevin Tolly

BIG BANDWIDTH ON CAMPUS

Next-generation applications — telephony, building management and the like — are on their way to the campus network. Key to their success is whether the critical enabler will have adequate resources or the use of adequate resource controls. Or, put in context, big bandwidth or quality of service (QoS).

As much as I'm a believer in the value of QoS, all indications are that network managers will use bandwidth to solve the problem.

The problem is as voice, data and building security networks merge into a "data utility," there is not only a greater volume of traffic, but a greater diversity of traffic characteristics.

Not all of the streams are equally important — in terms of delivery at least. Yet some less time-critical streams, such as file transfer, can gobble up whatever bandwidth is available. In the worst case, this robs bandwidth from time-sensitive applications, such as telephony, causing their performance to degrade to unacceptable levels.

There are those who say implementing bandwidth management, such as QoS, and making switches monitor and alter the traffic flow can make these converged networks work. Others say by throwing bandwidth at the problem, you'll solve the difficulty because, in the virtual sea of bandwidth, the traffic streams will never collide. Much as I favor control, I think the bandwidth side is going to win.

The problem is not with QoS. It works. It is, however, complex.

The only way to avoid that complexity is to solve the problem using the "raw bandwidth" approach. While it may not sound elegant, there is ample precedence. Our technology culture has become quite accustomed to solving problems using firepower rather than finesse. From micro, to mini, to mainframe, the way to guarantee better performance has been to fork over money for more powerful hardware.

The networking analogue is to overprovision bandwidth — bring Fast Ethernet to the desktop and Gigabit Ethernet or aggregated Fast/Gigabit links between the switches.

There is still a need for QoS. Even with a massively overprovisioned network, streams-bursting can cause congestion at aggregation points. Time-critical traffic could be delayed or discarded. Bad news should it happen — but how much exposure is there?

Clearly, the more bandwidth I build into my network, the less likely the scenario. But, without QoS, there are no guarantees. The problem is so few users have gotten burned by not having QoS that it seems like rolling the big-bandwidth-only dice is safe.

As I see it, until network equipment vendors can prove unequivocally to network managers that a non-QoS campus network is exposed to unacceptably high risk, it is going to be "big bandwidth" all the way as we build out our next-generation applications.

Tolly is president of The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at ktolly@tolly.com or www.tolly.com.

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Carriers & ISPs

The Internet, Extranets, Interexchange and Local Carriers, Wireless, Regulatory Affairs

Briefs

U.S. and **Japanese** government trade officials reached an agreement last week on telecommunications interconnection rates, capping four years of talks. The rate cuts, which will be applied retroactively from April 1, 2000, stand to benefit competitive carriers by at least $2 billion in the next two years, trade representatives say. The deal specifies two sets of reductions in interconnection rates, which are charges that Nippon Telegraph and Telephone (NTT) levies on other carriers for use of its lines to reach business and domestic consumers. For carriers that connect to NTT at the regional level, which includes a majority of non-Japanese telecom companies, the two sides agreed on a 50% rate reduction over the next two years, with a further reduction of at least 16% in the third year.

CoreExpress is buying 23,000 miles of dark fiber from Level 3 Communications to build its new nationwide fiber-optic backbone. CoreExpress is a St. Louis start-up that plans to offer users secure, guaranteed VPN services over multiple ISP networks. This is the first network infrastructure deal CoreExpress has announced, but it is willing to buy dark fiber from other providers. The terms of the deal were not revealed.

Global Crossing announced the sale of its incumbent local exchange carrier (ILEC) for $3.65 billion to Citizens Communications. Global Crossing is selling its local telephone business, which was originally known as Rochester Telephone and then Frontier Corp. Global Crossing's ILEC business offers services in 13 states. The service providers also struck a side deal through which Global Crossing will provide long-distance services to Citizens customers.

Sprint bolstering fixed wireless

BY DENISE PAPPALARDO

Sprint has big plans for its high-speed fixed wireless services that include new features and greater geographic reach.

Sprint Broadband Wireless Group is planning to let customers access their corporate networks from remote or home offices over Sprint's wireless multichannel multipoint distribution service (MMDS) network. Sprint is also developing wireless LAN features that make it easier for users to connect to Sprint's network.

Sprint Broadband Direct fixed wireless Internet access customers are now testing Sprint's new VPN service features, says Evan Conway, a marketing executive with Sprint Broadband Wireless. Conway would not elaborate on the specific equipment or encryption technology that Sprint will support, but says customers can expect security features that are typically associated with VPNs such as tunneling and authentication.

Sprint plans to support its fixed wireless VPN service over its high-speed MMDS network at competitive rates. Sprint is charging its customers $40 per month for its Internet access services that support 256K bit/sec upstream and 2M bit/sec downstream. Sprint has not officially announced its VPN service and pricing is not yet available.

"IP networking is driving MMDS, [local multipoint distribution service], DSL and cable modem services providers to offer VPN services," says Chris Whitely, project manager at Insight Research, a Parsippany, N.J., consulting firm. Businesses want to offer employees flexible access to their corporate networks, he says.

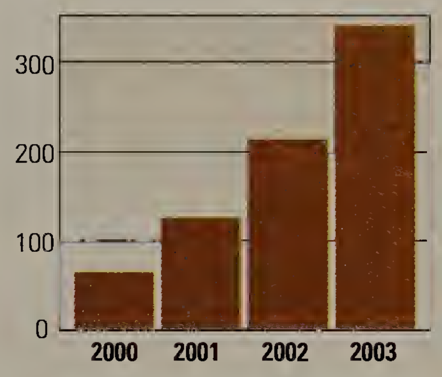
Sprint's new service plans also include adding wireless LAN support, Conway says. Sprint is testing two Lucent wireless LAN systems. The first includes a typical antenna and a wireless LAN system that will enable Internet access from several locations within an office or home.

The second system would decrease the line-of-site issues typically associated with MMDS service, Conway says. Instead of deploying an antenna outside an office or home, customers would use a PC Card with a small antenna attached. ◪

Fixed wireless growth

While the number of fixed wireless service users today is low, IDC predicts that the number of business users subscribing to those services will quintuple in the next three years.

Business users (in thousands):



SOURCE: IDC, FRAMINGHAM, MASS.

Start-up readies voice and data service mix

Everest Broadband Networks to target specific buildings with its offerings.

BY TIM GREENE

FORT LEE, N.J. — Everest Broadband Networks is joining the growing ranks of the most local of local carriers by selling combined voice and data services to specific buildings.

The start-up adds a new twist by focusing on linking corporate customers to application service providers (ASP) that can reduce the load of maintaining enterprise applications. Among ASPs whose services Everest will resell are Critical Path's for IP faxing and e-mail, Interliant's for Web hosting and Evoke's for Web conferencing.

Everest will sell bundles of services. Its initial high-end package, called Business-Pro Plus, is designed for five- to 100-desktop sites and costs $245 to $345 per month. The offering includes best-effort Internet access that can burst to 10M bit/sec, 10 e-mail mailboxes and domain name registration.

By October, the company will offer Liquid Megabit for $400 to $500 per month, which includes dedicated Internet access in 1M bit/sec increments that users can adjust via a subscriber management platform. It also includes a subscription to Bloomberg's electronic financial feeds, a managed firewall and content filtering.

Initial rollout of services will start in New York; Chicago; Los Angeles; Washington, D.C.; Toronto; Houston; Dallas; St. Louis; Baltimore; and Miami.

ALL ACCESS
Should a building owner be able to tell tenants which voice and data service provider to do business with? Read up on this hot issue.
find it DocFinder 9128 online

At first, Everest will resell long-distance voice services from Global Crossing. In about six months it plans to set up its own packet-based local voice services. The company is waiting for the technology to prove itself, says Joseph Varello, Everest's vice president of marketing.

Tenants in buildings that Everest services will plug their local router or switch into a 100M bit/sec Ethernet port in a switch that Everest installs somewhere in the building. The company calls that switch an Intelligent Service Node. The switch aggregates and prioritizes traffic from the customers in the building and backhauls it to Everest points of presence.

Everest plans to scale its network based on how many takers it gets in each building. For smaller buildings, tenants might share a T-1 uplink to an Everest POP. That connection could be boosted to a T-3 line or a fiber feed depending on demand.

The Intelligent Service Nodes are managed for Everest by Edgix, a firm that manages content delivery for ISPs.

Everest: everestbroadband.com

Eye on the carriers . David Rohde

WORLDCOM, SPRINT: FOCUS ON REAL NEEDS

One reason carriers merge is they've missed big market opportunities and have to fill serious gaps with a partner. It is so much worse when a merger fails and they've lost that time to address their problems.

Wouldn't it be nice if WorldCom CEO Bernie Ebbers and Sprint CEO Bill Esrey resolved to address their major market challenges without the chaos and confusion of megamergers?

Much of the harsh light of the failed merger's aftermath shines on Sprint. It has now gone yet another year without building or buying local networks in major metropolitan areas. Now the prospect of access to WorldCom's extensive local networks is gone.

Much of Sprint's activity has focused around areas that it perceived would help its merger effort by showcasing a consumer alternative to the Bells and AT&T's cable network. For example, it touted fixed-wireless local access — a service it has introduced in all of two cities. But Sprint is actually far behind independent fixed-wireless carriers like WinStar, which is raking in government contracts in city after city.

Sprint continues touting its Integrated On-Demand Network (ION) based on an ATM integrated-access device on the premises. But ION is overpriced from a consumer standpoint — about $150 per month — and use by business telecommuters is losing out to soaring demand for DSL and cable modems.

Sprint's own reports to the Securities & Exchange Commission reflect this problem. In 1999, ION earned not a dime in revenue, against $358 million in expenses. In the first quarter of 2000, ION took in $1 million in revenue against $137 million in expenses.

If you're thinking, "Gee, an ATM-based integrated-access service is not way up there on my to-do list," you're onto something. For example, for such an important Internet carrier, Sprint has an amazingly low percentage of the Web hosting business. Sprint and WorldCom could start addressing the Web acceleration and content delivery field. At least AT&T has taken advantage of the WorldCom/Sprint merger period to step out in front in this area.

To be sure, AT&T's Intelligent Content Delivery Service (ICDS) hasn't set the market on fire. ICDS isn't like the service offered by Akamai, with local servers collocated on multiple IP networks worldwide, feeding content to nearby end users. Instead, ICDS uses Inktomi software and load-balancing switches to optimize content delivery within AT&T's own IP network.

AT&T says its off-net strategy for content distribution will come later this year. Could we hear one from Sprint and WorldCom? Speaking of WorldCom, everyone knows WorldCom's principal need is for a big wireless network. So why doesn't Ebbers just go out and buy one? Lord knows he's good at that.

It's when these needs don't get addressed that carriers wind up asking regulators for favors, such as approval for what the rest of the world saw as an anticompetitive merger.

Rohde is managing editor of The Edge section of Network World. *He can be reached at drohde@nwu:.com.*

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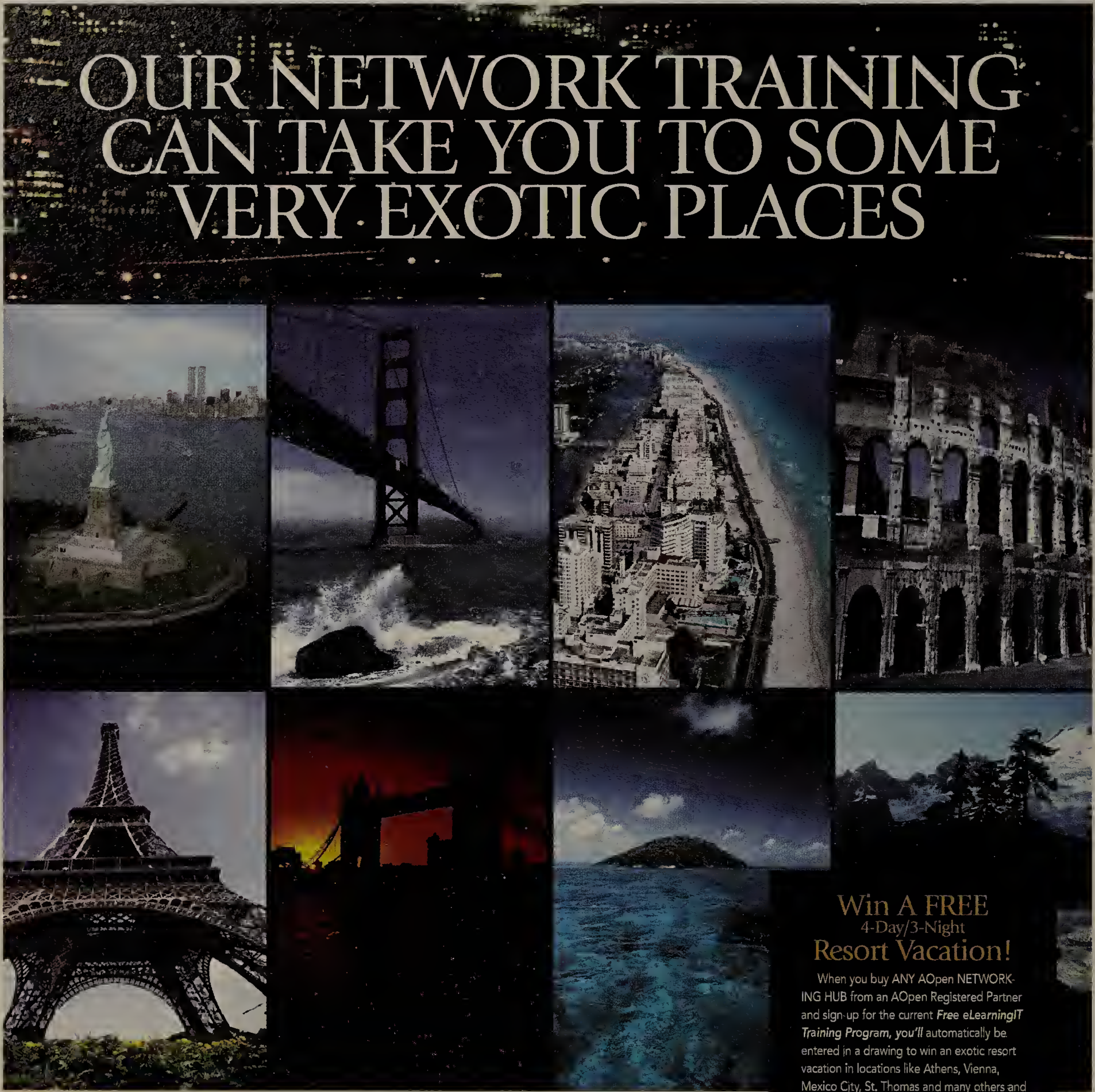

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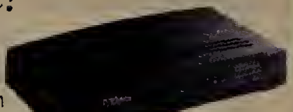

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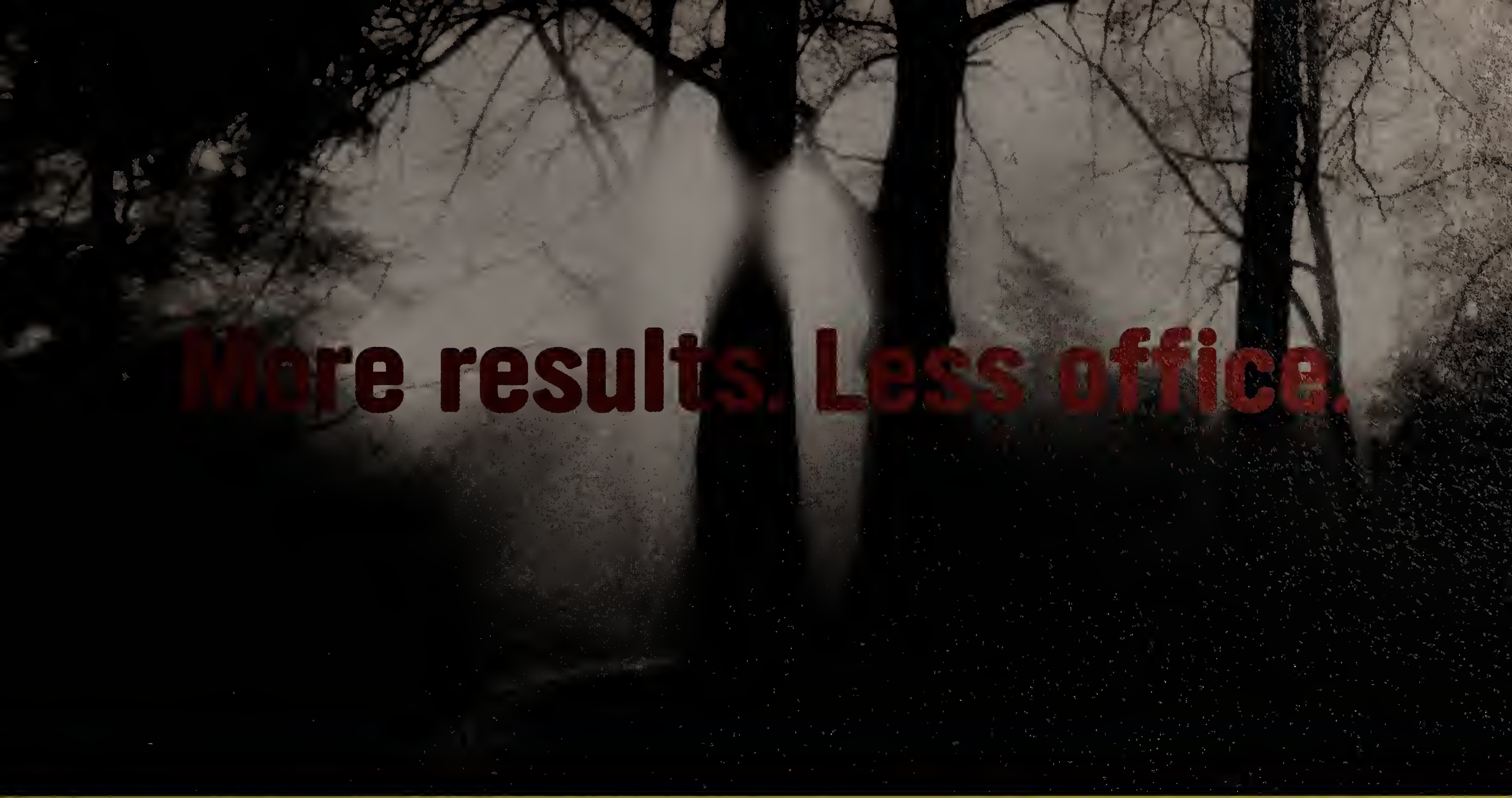

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Multihomed corporate nets on the rise

BY CAROLYN DUFFY MARSAN

MULTIHOMING

Network technique provides redundant and reliable Internet access.

Back in 1995, EarthLink was a small, Southern California ISP with dreams of building a nationwide network and audience. To grow rapidly, EarthLink chose a novel approach of using multiple carriers, including UUNET, PSINet and Sprint, to create a large and reliable network for running Internet applications.

Today, EarthLink executives credit this approach — dubbed multihoming — as key to its success in attracting a customer base of more than 3.4 million.

Specifically, multihoming refers to the use of multiple ISPs to provide Internet access. The typical setup uses two ISPs: one for incoming Internet traffic and the other for outbound Internet traffic. Network engineers use high-end routers running the Border Gateway Protocol (BGP) to load balance the traffic between the ISPs. Most ISPs require a minimum of a T-3 line for multihoming.

"Multihoming allowed us to expand very quickly, and it allowed us to insulate our customer base from shortfalls in capacity to a greater degree than our competitors," says Jon Irwin, executive vice president of operations at EarthLink.

A growing number of dot-coms and large firms are copying the ISP industry and creating multihomed nets of their own. Among the users of multihoming are securities firm Smith Barney, online brokerage firm eTrade, e-commerce companies eBay and Amazon.com and high-tech giants IBM and Hewlett-Packard.

These companies are multihoming to improve the reliability of their Internet access, particularly between their data centers and carriers' point-of-presence (POP) sites where traffic enters the backbone of the Internet. What drives these companies to take on the technical and management challenges of multihoming is fear of catastrophic failures caused by fires, earthquakes or backhoes.

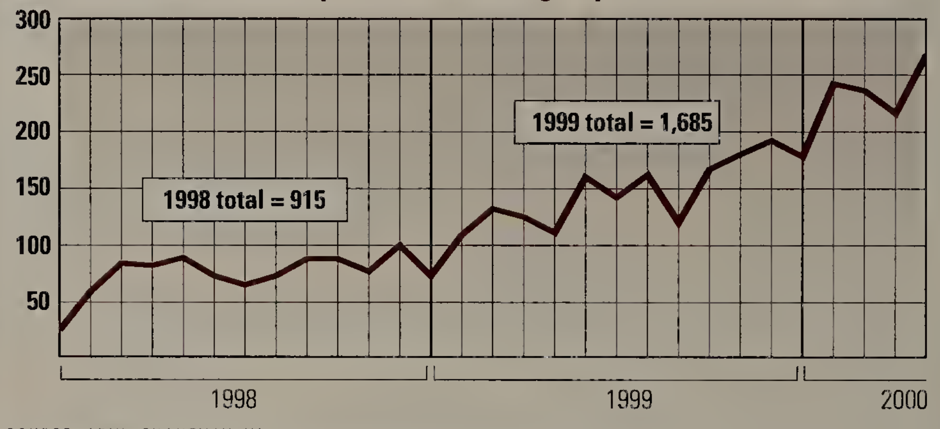
"We definitely see more customers wanting to be connected — multihomed — to different ISPs due to the fact that more mission-critical applications are going on the Internet . . . and companies can't afford downtime," says Alan Bavosa, group product manager of access services for Concentric, a San Jose company that provides Internet business solutions. "As companies fill up their pipes with one ISP, it's a good, sound business strategy to diversify and to move some pipes to another ISP so they don't have all their eggs in one basket."

The rise in multihomed networks is shown in data gathered by the American Registry for Internet Numbers (ARIN). Each multihomed net requires an Autonomous System Number (ASN) assigned by ARIN. ASNs are unique numbers used to identify systems that can exchange exterior routing information with neighboring ASN-qualified systems.

Ascending ASNs

The increase in multihoming — linking two or more service provider nets — caused the number of assigned Autonomous System Numbers to jump by 84% last year. ASNs identify systems able to exchange exterior routing information with other ASN systems.

Number of ASNs issued by the American Registry for Internet Numbers



SOURCE: ARIN, CHANTILLY, VA.

ARIN President Kim Hubbard says the growth in ASN assignments is directly tied to the rise in multihomed networks. The amount of ASNs assigned each month by ARIN has grown sharply since January 1999 (see graphic). This year is on track to be a record breaker. Altogether, ARIN has assigned more than 12,000 ASNs.

But multihoming is not a trend that ISPs like to discuss. They prefer to tout the reliability of their own networks and their high-availability offerings. ISPs also are quick to reference customers that are giving them exclusive deals rather than multihomed arrangements where they carry half or less of a company's traffic.

But companies with multihomed networks view those networks as the only way to guarantee 100% uptime. Multihoming also helps companies reduce their Internet access costs by pitting ISPs against each other to bid on additional capacity.

24/7 Mail uses a multihomed net to run an e-mail marketing service that sends more than 25 million messages per day. The Denver division of 24/7 Media uses two ISPs, Verio and Rocky Mountain Internet, to carry the outbound e-mail traffic via dual DS-3 lines at 45M bit/sec each. 24/7 Mail has two Cisco 7206 VXR routers that run BGP V4. Two network engineers manage the Cisco routers and monitor route balancing.

"We've been multihomed for about two years because there is no ISP or local-loop provider that can provide the highest level of availability," says Lonnie Maynard, chief technologist at 24/7 Mail. "We've had no downtime since we put this strategy in place."

Maynard expects by next year his network will carry 100 million messages per day and require bandwidth of 175M bit/ sec. "My strategy is only to connect to tier-one ISPs that prove they have sufficient bandwidth and peering relationships," Maynard says.

Healtheon/WebMD takes multihoming a step further by using five ISPs — UUNET, Sprint, Qwest, @work and AT&T — to carry traffic to and from its Santa Clara data center. The medical Web site moves traffic between the carriers to avoid outages and optimize network performance.

"We can sometimes manipulate routing to avoid congested public peering points to improve performance," says Steve Curd, chief information officer at Healtheon/WebMD. He says points where major Internet carriers connect to each other "experience congestion very often, adding to the network latency and degrading network performance."

Although it ensures reliability, multihoming has its drawbacks. It requires high-end routers and network engineers who know BGP and understand the Internet's routing system. Companies also can run into problems with IPv4 Internet address space, particularly if it was delegated from an ISP rather than ARIN.

Companies also face management challenges in getting multiple ISPs to work together to solve problems. That's why ISPs push alternatives to multihoming, such as collocation, mirrored data sites, hot and cold backup sites and multiple access lines to POPs.

Pete Charbonneau, network and systems administrator at Williams College in rural Massachusetts, tried multihoming but switched back to one ISP after multihoming became too expensive. In 1999, Williams College employed two T-1 lines — one from GTE and one from Cable & Wireless — to provide Internet access to its 3,500 users.

"We did it for redundancy purposes and to increase our bandwidth," Charbonneau says. "But it was costing us $4,000 a month for one of our T-1s and $2,800 a month for the other T-1. That's a very costly proposition to [multihome] out in the sticks where no one wants to serve us."

So this year Charbonneau purchased three T-1 lines from Cable & Wireless, using inverse multiplexers to handle failover if any of the lines go down. "It's easier to get redundancy from one carrier," he says. ◪

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Briefs

Netegrity in Waltham, Mass., has announced plans to ship an administration tool next month for its SiteMinder 4.5 Web access-control software that will let network managers set up centralized security policies for SiteMinder but delegate user management by department. The tool, called Delegated Management Services, will be available for Windows NT and Unix networks, with per-user pricing at around $1.

Netegrity: www.netegrity.com

SecureLogix in San Antonio, Texas, has begun shipping the TeleWall 2.0 firewall appliance to protect T-1, ISDN and analog phone lines from hacker penetration. The TeleWall appliance, which monitors voice, data and fax usage, now includes detailed departmental billing reports, multiple SNMP traps and a way to recognize the military's STU-III secured, encrypted phones. The firewall appliance costs $7,000.

SecureLogix: www.securelogix.com

Boston start-up **TrueSystems** has announced a product, called TrueAccess, that lets a user access multiple applications in Windows NT or NetWare networks through a single sign on. It includes Windows client and Windows NT server software designed to automate user verification and reduce the time it takes to input passwords and manually log on. TrueAccess is available now and starts at $50 per client; the server costs $2,000. TrueSystems also sells a product called TrueControl, which is monitoring and control software for networks running Microsoft operating systems.

TrueSystems: www.trueaccess.com

eBay acts to curtail Internet fraud

Online auction firm puts systems in place to protect consumers.

BY ELLEN MESSMER

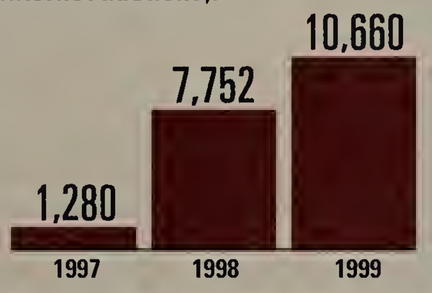
The rising tide of Internet-based fraud is forcing online auction sites to redouble their efforts to protect consumers and the sites' business reputations.

At the eBay auction site, for example, the main problem is sellers who never deliver the goods they advertise for sale on eBay or substitute inferior goods. To combat the growing problem from such "fraudsters," as law enforcement likes to call them, eBay has put in place a slew of new online business practices.

Initially, eBay relied on "community policing," asking its users to report suspected fraud through a Web form. But as eBay has expanded its user base — there are 700,000 registered eBay users in the U.S. alone — fraud has risen, too. So eBay is taking new measures.

Fraud alert

Number of consumer complaints the Federal Trade Commission has received about Internet fraud (the most common complaints are about Internet auctions):



"For one thing, the seller on eBay now has to supply eBay with a credit-card number," says Robert Chestnut, eBay's associate general counsel, who spoke on the fraud issue at the recent e-Gov conference. The online auction firm uses the card number to verify the seller's address.

In addition, eBay has decided to insure every transaction on its Web site up to $200, with a $25 deductible to the buyer.

EBay also recently hired a firm called Square Trade to mediate between buyers and sellers when disputes arise. The auction firm subsidizes most of the service, with buyers and sellers paying about $10 each. That way, eBay hopes to differentiate between cases of resolvable disagreements and downright fraud.

See **Fraud**, page 34

Directory tool controls network access rights

OpenNetwork Technologies software also will feature measurement, analysis tools.

BY JOHN FONTANA

As the enterprise directory concept continues to pick up steam, IT executives are beginning to see more sophisticated applications that run on top of those directories.

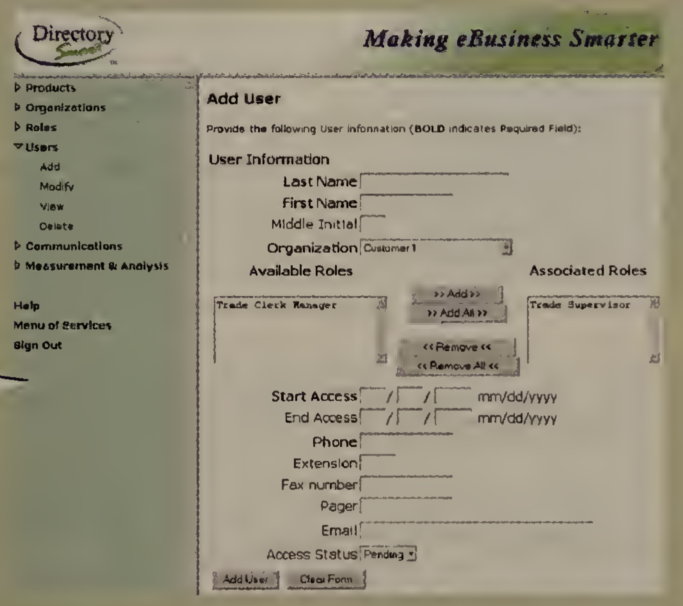
OpenNetwork Technologies is targeting users of those applications with DirectorySmart 4.0, a directory-enabled access control application announced last week. The software is designed to control access to Web-based applications and data especially for business-to-business e-commerce.

The software relies on the underlying directory to supply user information and allows administrators to assign application access rights to those users. The package also lets customers delegate administration of access rights.

Later this month, OpenNetwork will add measurement and analysis tools, and messaging features to DirectorySmart. The new tools let network professionals track data such as who uses what applications and when, and which applications are most popular.

Directory app

OpenNetwork Technologies this month will ship DirectorySmart 4.0, a directory-enabled access control application.



Add User

Provide the following User information (BOLD indicates Required Field):

User Information

Last Name
First Name
Middle Initial
Organization Customer1
Available Roles: Trade Clerk Manager
Associated Roles: Trade Supervisor
Start Access / / mm/dd/yyyy
End Access / / mm/dd/yyyy
Phone
Extension
Fax number
Pager
Email
Access Status Pending

From a browser-based interface, DirectorySmart users can create user profiles that control access to Web-based applications.

"We want to learn who is using our Web site and what they are using it for," says Anne Castro, chief design architect for Blue Cross and Blue Shield of South Carolina in Columbia. She uses DirectorySmart to manage access for four Web sites with about 4,000 users. Without DirectorySmart, Castro says she would have had to hard-code access options and security for each set of users. "I've always said, 'If you build it, they may not come,' and if that happens, you need to know why and

See **OpenNetwork**, page 34

Ease the pain of managing Exchange server

Discus Data Solutions' new Exchange Management System fills the administrative gaps in Microsoft's messaging system.

BY TRAVIS BERKLEY, NETWORK WORLD TEST ALLIANCE

There's no question that Exchange is a popular e-mail package. Your feelings toward this product, however, may vary depending on whether you are an Exchange user or an Exchange administrator. While users often find using the Outlook client an easy thing, administrators often wish they had a little help in getting their jobs done.

Exchange administration lacks granularity. A user is either a full administrator or a normal user. Administrators must fix all problems, from the trivial to the catastrophic. It would be nice if administrators could let someone else handle minor problems, like name, address and phone number changes.

It would be great if Human Resources staffs could automatically create Exchange accounts when new employees were entered into a payroll system. And it would be convenient for those accounts to automatically be removed when the employees left the company.

Discus Data Solutions created its Exchange Management System (ExMS) as a means of making Exchange administrative hassles easier to handle. We found ExMS adds management functionality to Exchange that saves time and effort, letting administrators focus their attention on problems worthy of their training and skills. For these reasons, ExMS earned the *Network World* World Class Award.

The four main components of ExMS are the Account Creator, Account Updater, Account Deletion Manager and the Directory Integrity Agent.

ExMS is installed into containers within Exchange. Most Exchange systems have the "recipients" container, where users are created by default. If your system is customized to include many containers, you can install ExMS to any or all of these containers.

A mailbox recipient is created for each process within the container, and each process is configured to run as a specific Windows NT domain account.

Whether using predefined Outlook forms created by ExMS on installation or authenticating through a Web interface, authorized users can create new accounts, modify properties of existing accounts or even delete accounts.

Administrators will notice that this lower-level administrative interface looks similar to the forms used in the Exchange Administrator. Addressing is handled automatically within the form so users don't need to know which process to send a request to. They select the task they need to do: create, update or delete.

How We Did It

Our Exchange server and Discus Data Solutions' Exchange Management System were installed on a Tangent Pentium II 300-MHz server with 256M bytes of RAM and 9G bytes of disk space. Exchange 5.5 Service Pack 3 was installed on top of Windows NT 4.0 Service Pack 6, and was populated with approximately 2,000 user accounts. Microsoft's Internet Information Server was also running on our server.

Our desktop units were Dell OptiPlex G1 machines.

We did account creation, deletion and updates using the Outlook forms and the Web interface that ship with the product. We also used the ExMS Directory Integrity Agent to run reports and did additions and modifications.

ExMS then sends the request to the appropriate agent to be processed. By default, a response is sent back to the originator. If the request was sent via Outlook, a new e-mail message would appear in the originator's inbox detailing the event.

For Web interface users, a new window is opened to give success or failure results. Additional notification can be sent to other administrators so they can stay informed.

Another nice feature of this product is that the forms can be sent to someone for approval before they are processed. For example, it may be advantageous to let lower-level administrators request new accounts or changes, but have a superior review them. By accepting the requests, transactions are sped on their way.

As far as deleting old accounts, ExMS provides some extra safeguards. When you wish to get rid of an account, the form first lets you "disable" the account for a specified period of time. This will "hide" the account from the global address listing and schedule the account for deletion automatically at the specified time.

In addition, the ExMS program can delete the associated NT account, a step administrators usually do manually. During this time, you can go back and "enable" this account, effectively restoring this user back to an active account, or delete the account.

There are also forms to create and maintain distribution lists. ExMS can let an administrator put someone in charge of a particular list and add or remove recipients as necessary.

What's under the hood?

As useful as these features are, it's obvious you can only do work on one account at a time. This is where the Directory Integrity Agent (DIA) comes into play. The DIA uses scripts to perform an almost limitless array of tasks, such as synchronizing accounts with other databases and running reports on your Exchange system. These can be scheduled to run at various times or started on demand.

NetResults

Exchange Management System

RATING: 9.20 **COMPANY:** Discus Data Solutions, (212) 279-9090, www.discusdata.com. **COST:** Starting at $7,500 for 1,000 users. **PROS:** Provides administrative granularity; very flexible in its features and its ability to be programmed. **CON:** Taking full advantage may require help from Discus Data.

Exchange	Functionality 50%	Scalability 30%	Installation 10%	Documentation 10%	Total score
Management System	10	9	8	7	9.20

Individual category scores are based on a scale of 1 to 10. **Percentages** are the weight given each category in determining the **total score.**

Many companies have a payroll database that is the "master" database, but everyone also needs an e-mail account. The DIA can run a script that checks for additions to the payroll database and automatically creates an Exchange account for these new people. How often the script runs is up to you. It also can remove accounts when they are deleted from your external database or mirror any changes made to any other Open Database Connectivity (ODBC) database.

The DIA can work with any data source that you define in the ODBC control panel. This includes SQL Server-enabled databases, smaller access databases, and even comma-delimited and text files.

You can also use the DIA to generate reports. One script available to customers runs through the recipients and then reports on how large their mailboxes are. Fishing this information out of the Exchange Administrator is time-consuming, but with ExMS, in-depth information about user behavior can be delivered automatically to your in-box each week.

ExMS comes with a small library of popular scripts and examples. Discus Data also has consulting services available to help create custom scripts.

If you have a very small Exchange system, you may not need to dole out authority to other people to save time. But if you have a system of any appreciable size, chances are ExMS could make life a lot easier.

Berkley is LAN support supervisor with Computing Services at the University of Kansas. He can be reached at berkley@ukans.edu.

Berkley is also a member of the Network World Test Alliance, a cooperative of the premier reviewers in the network industry, each bringing to bear years of practical experience on every review.

For more Test Alliance information, including what it takes to become a member, go to www.nwfusion.com/alliance.

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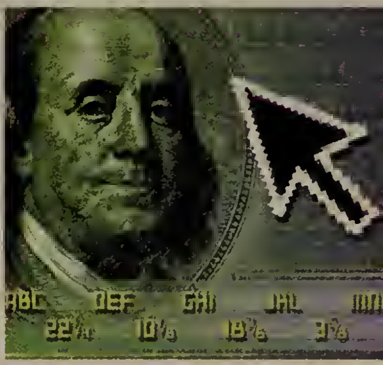

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* Source: Media Metrix, May 2000

'Net Insider . Scott Bradner

TOYSMART, PRIVACY DUMB

It would have been hard to manufacture a more perfect test case to find out if companies have to tell the truth in their privacy policies.

Toysmart, a failed e-commerce company, put an ad in *The Wall Street Journal* offering to sell its customer database as part of its bankruptcy process even though the company had promised not to share the information with any third party. This caused most privacy advocates to go nonlinear, and the U.S. Federal Trade Commission filed a complaint in a U.S. federal court to stop the sale of the information.

The story of Toysmart was a sad tale even before the recent privacy-related developments. The company started out quite well, focusing on nonviolent and educational toys, and managed to get a major investment from Disney, which wound up owning 60% of the company. But things quickly deteriorated when Disney had trouble coming up with a rational Web strategy, and Toysmart had to file for bankruptcy protection in June. This was the case of a company with a great deal of promise wiped out because an old-line retailer could not come to grips with the new Web-based e-commerce environment.

As in all bankruptcy cases, the company's assets are being put up for sale to try to get some money for the creditors. But in this case, one of the items offered for sale was Toysmart's "customer files." These files were being offered in spite of a Toysmart privacy policy that is still on the company's Web site. It says, "When you register with toysmart.com, you can rest assured that your information will never be shared with a third party." Toysmart's Web site also displays the TRUSTe (www.truste.com) seal of approval indicating that Toysmart will abide by the stated privacy policy.

When TRUSTe heard about the attempted sale of customer information, it contacted the Federal Trade Commission, which has now challenged the sale on the grounds that Toysmart had engaged in deceptive trade practices by promising one thing in its privacy policy, then doing something different. Disney, in an apparent good-guy move, offered to buy and then "retire" the database, but the real effect of such a move would be to establish the precedent that this type of violation of a written promise is OK.

On the surface, this seems like a very simple case — written promises mean something or they do not. But the assumption that creditors will get the maximum return during bankruptcy processes makes the outcome hard to predict. The database has value, and at this point may be the most valuable thing the shell of Toysmart has to offer.

I sure hope the FTC succeeds in establishing the precedent that companies have to live up to their promises even in the face of bankruptcy. It is hard to overestimate the damage to the future of e-commerce if the commission fails. Meanwhile, I will not give my name and address to the clerk at Radio Shack when he asks for it.

Disclaimer: Harvard's promises are its students and they are unpredictable, but the above refusal to supply a name is mine.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@sobco.com.

Fraud,

continued from page 31

As another way to hold fraud in check, eBay purchased a company called BillPoint. BillPoint's service is based on the idea of allowing sellers to process credit card transactions online even though sellers don't have what the credit card industry calls merchant accounts.

BillPoint charges sellers a 3.5% fee for each item sold at auction that the buyer agrees to pay for with a credit card instead of certified check. This way, the buyer is protected under the U.S. credit card laws, which allow for chargeback.

Plus, BillPoint — which worked out the arrangement with Visa and MasterCard — doesn't actually give card numbers to sellers.

Chestnut says eBay works closely with law enforcement in the U.S. and abroad to nab fraudsters.

"We often know who all the victims are in a fraud case," Chestnut notes, pointing out that law enforcement is not always inclined to take on a fraud case that only involves $500.

But eBay, cultivating contacts with law enforcement, is now organized to e-mail the appropriate investigator directly with information submitted by what could be dozens of victims tricked in a fraudster's online scam. Victims can fill out a Web-based complaint form on the eBay site.

In addition, eBay cooperates with manufacturers such as Gucci to identify fake goods or with musicians like Metallica and Bruce Springsteen, whose representatives contact eBay when they spot unauthorized music sales. Software companies, fighting piracy, are also in regular contact with eBay.

> **"Last year, we got over 10,000 complaints, mostly where sellers failed to deliver the goods."**
>
> Delores Gardner, attorney, Federal Trade Commission

The Federal Trade Commission, which has taken a strong stand to combat Internet fraud, has seen a tidal wave of complaints, mostly related to online auctions.

"Last year, we got over 10,000 complaints, mostly where sellers failed to deliver the goods," according to Delores Gardner, an FTC attorney. There are about 1,400 online auction sites.

The FTC has no problem with eBay's BillPoint service. But the FTC is more critical of other card services, such as BidPay, that work by providing a cash advance to a seller based on a buyer's credit card. The cash advance requires the buyer to waive the right to the chargeback whether the buyer is aware of that or not, Gardner notes.

As to whether online auction sites are liable for the misdeeds of sellers (or in more rare instances, buyers that commit fraud by lying about what they received), the FTC gives a qualified "yes."

"As for liability, we handle this on a case-by-case basis," Gardner says. If an online auction site is negligent in policing for fraudsters (for instance, allowing them repeated infractions), then the site could well be held liable.

That could mean shutting down the site and possibly holding its operators responsible for monetary damages. ◪

COMBATING FRAUD

Newsletter: Proving someone stole your identity is hard to do.

White paper: How identity fraud is done and what can be done to protect against it.

Report: The legal implications of e-commerce.

find it DocFinder 9130 online

OpenNetwork,

continued from page 31

be flexible enough to make changes without creating another major project."

With the new tools, users can run a number of queries to track use of Web applications, see who has what access rights and track security enforcement.

Unfortunately, users cannot create custom queries with the 4.0 release, but OpenNetwork is working on an application programming interface for its reporting engine.

"OpenNetwork seems to have more of a focus on auditing than other vendors," says Phil Schacter, an analyst with The Burton Group in Midvale, Utah. Vendors such as Oblix, Netegrity and En-Commerce are also attacking the issue of directory-enabled access control.

"I think the evolution of these products needs to strengthen the auditing aspect. As more critical processes move to the Web infrastructure, the corporate auditors will need these tools," Schacter says.

DirectorySmart works with three directories: IBM's SecureWay, Netscape's IPlant and Novell's eDirectory. It runs on IBM's AIX, Linux, Sun Solaris and Windows NT 4.0. OpenNetwork plans to release a version for Active Directory and Windows 2000 next month.

Pricing starts at $200,000. ◪

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FOUNDRY
NETWORKS

Technology Update

An Inside Look at the Technologies and Standards Shaping Your Network

Ask Dr. Intranet

By Steve Blass

You recently said Lightweight Directory Access Protocol (LDAP) directory services may be able to provide address book information for e-mail clients. What's the difference between directories, directory services and metadirectories?

A directory is the collection of information about users, systems, groups, networks, services and identities. The directory service provides access to the information and the mechanisms for adding, modifying, changing and deleting the information in the directory.

Metadirectories provide the capability to "join" information across different directories — some build a central data store and others build views on the fly. Directory services can provide centralized name-space and security relationship management solutions for user and group administration; network resource access authentication, authorization, auditing and accounting; desktop environment management administration; security policy practice and procedure implementation; and directory information administration.

Domain Name System is one directory service. Directory services offerings for intranet systems are primarily based on LDAP. Its functionality is available in existing e-mail clients, Web interfaces and application software. Windows 2000 Active Directory is one directory service that supports LDAP.

Blass is a network architect with Sprint Enterprise Network Services in Houston. He can be reached at dr.intranet@paranet.com.

OSPF overhaul boosts IP performance

BY SPENCER GIACALONE

Since 1990, the Open Shortest Path First protocol has enabled routers to govern the IP networks. The OSPF protocol applies to routing, which allows everything else on a network to work.

Recently, OSPF underwent a complete overhaul. OSPF Version 3 now permits routers to forward IPv6 data across networks, according to the Internet Engineering Task Force (IETF).

OSPF Version 3 boosts versatility so networks can be adapted to changing requirements. It allows complex networks to be simplified and includes enhancements to ensure that upgrades integrate safely and easily. OSPFv3 also has been streamlined, and its security has been increased.

A main goal of OSPFv3 was to "create a routing protocol independent of any specific network layer," says co-designer John Moy. To accomplish this, OSPFv3's inter-router messages have been redesigned. Unlike past versions, OSPFv3 doesn't insert IP-based data in the headers that begin its packets and link state advertisements (LSA). To perform critical tasks that used to require IP header data, such as identifying LSAs, which distribute routing data, OSPFv3 utilizes network-protocol-independent information.

In addition to changing header data, OSPFv3 redefines the roles its LSAs play. In OSPFv3, the tasks of advertising network topology and IPv6 data are divided among new and existing LSAs.

For example, OSPFv3's network and router LSAs no longer distribute IP data; routers use them solely to discern network design. To advertise the data removed from these LSAs, OSPFv3 introduces two dedicated IPv6 messages, termed the Intra-Area-Prefix and Link LSAs. By reducing dependency on IPv6, OSPFv3's packet and LSA improvements enable easy support for new network protocols. OSPFv3 is versatile enough to transcend IPv6 with minor network upgrades, instead of major protocol migrations.

To supplement its versatility, OSPFv3 increases the number of optional capabilities, such as multicast OSPF, that can be implemented. To achieve this, OSPFv3 expands the Options data field, which is used by network devices to advertise enabled capabilities. The Options field is contained in most OSPFv3 interrouter messages. Running OSPFv3, devices can support as many as 24 optional capabilities. Previous versions supported only eight.

To simplify the construction of complex fault-tolerant networks, OSPFv3 introduces Instance IDs and the R-bit option. As a component of every OSPFv3 packet header, Instance IDs can control communication between routers sharing a physical network and OSPF area, without relying on complex authentication schemes or access lists, as needed in the past. In addition to Instance IDs, OSPFv3 can bring effective redundancy to end systems, such as servers, with R-bit.

"The R-bit is a way for hosts to wiretap the routing protocol safely, participating in OSPFv3 without attracting nonlocal traffic," Moy says.

OSPFv3 ensures that future upgrades integrate smoothly with new mechanisms, including flooding scopes and handling options. Like a passport for LSAs, routers use flooding scopes to permit or deny travel across the net. The flooding scope's range limits every LSA (and, therefore, its effect on the network) to the local link, an area or the entire OSPFv3 network. Because routers can only enforce the flooding scope of readable LSAs, handling options are also incorporated into these messages. Handling options instruct routers to contain or forward undecipherable LSAs.

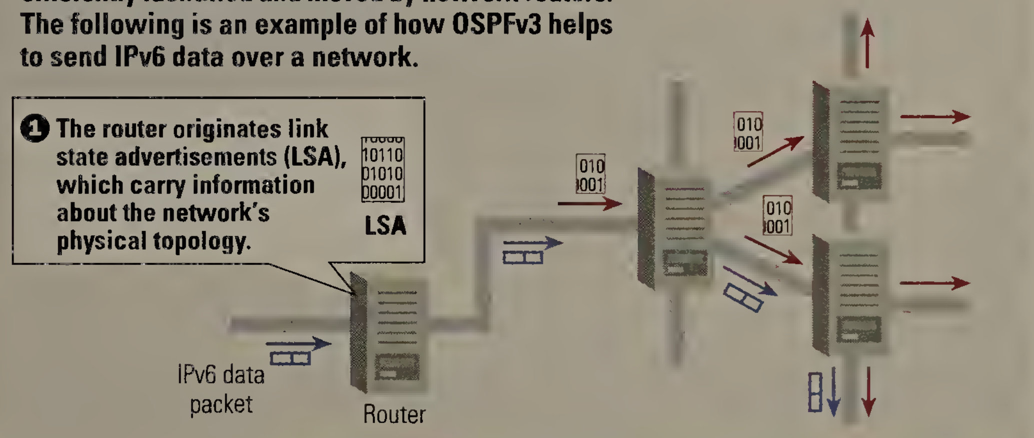
In OSPFv3, less security is definitely more. To simplify message structure, OSPFv3 breaks from the past by providing no inherent security. By relying on IPv6's integrated system of packet security subheaders, OSPFv3 messages can be authenticated *and* encrypted, a feat that previously required the addition of separate and complex protocols.

OSPFv3 offers increased capabilities, and it's so versatile that new network protocols can be easily supported. New features simplify network design and operation. With OSPFv3, the integration of updates will be less worrisome. Finally, outdated portions of OSPFv3 have been removed, and its security has been boosted.

HOW IT WORKS

OSPFv3

In previous versions of the Open Shortest Path First (OSPF) protocol, only IPv4-based traffic could be efficiently identified and moved by network routers. The following is an example of how OSPFv3 helps to send IPv6 data over a network.



❶ The router originates link state advertisements (LSA), which carry information about the network's physical topology.

❷ Other routers on the network receive LSAs and install routing information into routing tables, then forward LSAs to the next hop. In this case, OSPFv3 is used to tell each router that IPv6 data will be sent over the network.

❸ Once IPv6 data is sent, routers on the network are able to identify the traffic and ensure that the most efficient path is used.

Giacalone is a principal consultant at Predictive Systems in New York, a network consulting firm focused on the design, management and security of large-scale networks. He can be reached at spencer.giacalone@predictive.com.

Gearhead — inside the network machine . **Mark Gibbs**

IF IT'S TUESDAY IT MUST BE SOMEWHERE IN N.Y.

A question that has come up with monotonous regularity in Gearhead's life is "Where the hell are we?" This has nothing to do with intoxication and everything to do with too much travel. Sure, if it is Tuesday it must be New York, but where in New York?

The solution is the Global Positioning System (GPS). GPS gives your position by measuring your distance from a constellation of U.S. government satellites.

Until recently the U.S. government was in the habit of degrading the signals sent by the satellites so that the bad guys (naming no names) couldn't use the positioning data to drop a bomb on the Oval Office (although all it apparently takes to bomb the Oval Office is a guided intern, but we digress).

To many people's pleasure and business benefit, the degradation has been removed, so instead of being accurate to within several hundred feet GPS is accurate to about 20 feet.

It was with some excitement that Gearhead received one of Garmin's latest GPS devices: The eMap (www.garmin.com/products/emap/), which retails for about $242. This device figures out where you are, helps you get to where you want to go and tells you where you've been.

The eMap is an understated device about the size and heft of a cell phone. It has a 120-by-160-pixel, four-level gray-scale LCD screen (1.7 by 2.2 inches) with backlight that is reasonably readable in everything but direct sunlight.

The GPS display shows your latitude and longitude, the satellites the unit has acquired, your elevation, speed and the accuracy of the given position.

The basic map display shows speed, trip distance and time as well as the map with a marker for you position. As you move, the map moves automatically and you can choose to display the map with north or your track at the top of the display.

The eMap has a built-in base map of North and South America, and you can download maps of street-level detail by plugging the eMap into your PC's serial port. The only complaint is the cable connector on the eMap is hard to plug in. Also, we'd like to see a Universal Serial Bus interface.

Using the eMap is cool: You can set waypoints and the eMap will record your track plus timing data and provide directions. You can record, upload and download routes, monitor your progress with the trip computer, find out sun and moon rise and set times and check the moon phase.

For weary travelers who would like to know where they are, this is it. There's nothing cooler than calling up on your cell phone and saying "We're 20.2 miles away and should arrive in 23.6 minutes. Oh, the sun will set in 12 minutes and it's a full moon tonight." Way cool. Ten gear teeth out of 10.

GEARHEAD RATING

10 *Garmin eMap*

1=awful, 10=insanely great

Positional data to gb@gibbs.com.

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Opinions

Editorial

Pausing to marvel at telecom's little wonders

Ever stop to wonder why telephones have those handy star and pound keys? After all, the keys have been around longer than the voice mail systems that rely on them. Or why the Bell system ran four wires to your house even though you only need two for phone service? Could someone have foreseen the need for DSL way back then?

In terms of foresight, it appears the star and pound keys were put there by design, but the Bell founding fathers didn't have data links in mind when they decided to wire the nation with four pairs instead of two.

According to AT&T, when the Touch Tone phone was introduced near Pittsburgh in 1963 it only had 10 keys, paralleling the 10 finger holes on the rotary dial. Each row and column of keys on the keypad was assigned a frequency, so depressing a key generated a tone comprised of two frequencies.

This layout meant there were two tones left unused on the bottom row, so two keys were added in 1968 for "advanced communications." According to AT&T, one of the earliest uses for these keys was an internal computerized order entry system: Field workers with the company's Western Electric unit could dial in to the system and order parts using a Touch Tone phone.

But the big controversy was what to call the new keys. The star key was universally recognized and easy enough to name, but finding a second symbol with a simple name was problematic. After several field trials, Bell Labs settled on the pound sign, even though many people referred to the symbol as the number sign.

The point is, Bell Labs magicians saw the future and added the keys in anticipation of computerized needs.

The decision to run four wires to the home was apparently driven by simpler motivations. While the history is a little sketchy, it seems the Bell monopoly convinced regulators that installing four wires would lower long-term repair costs. The government bought the argument and let the company recover the added installation costs from the consumer.

Thanks to that, today you can get a second phone line or DSL installed without waiting for your local exchange carrier to roll a truck.

Ahh, the wonders of this miracle of technology called the phone system that we simply take for granted.

—John Dix
Editor in chief
jdix@nww.com

Message Queue

COMPUTUS INTERRUPTUS

In his column "We interrupt this column . . ." (www.nwfusion.com, DocFinder 9124), Kevin Tolly says, "Even I'm not ready for Linux."

Linux really isn't that bad — not when you look at the alternative. A commercial version like Red Hat installs pretty painlessly, and the defaults give you a usable system with decent security. StarOffice has many of the same faults as Microsoft Office — it is a bloated resource hog — but in my experience, it is much less likely to hang or crash for no apparent reason, and the interface looks familiar to someone with a Windows background.

Les Denham
Vice president
Interactive Interpretation & Training
Houston

While I applaud the aim of Kevin Tolly's column "We interrupt this column . . . ," I regret it has taken him and the rest of the computer press such a long time to notice that this is the way Microsoft software has performed all along.

Maybe Tolly isn't ready for Linux, nor have I been able to switch completely — yet. But at least I'm smart enough to go nowhere near Windows 98, never opening more than three programs at a time and all the other stuff you need to do to keep that glass-fragile Registry from eating its own entrails.

Ashton Brown
Kenwood, Calif.

Microsoft develops software for thousands of hardware components made by hundreds of companies. So who is to blame when glitches arise? Microsoft, because it doesn't have every piece of code exactly compatible with every piece of hardware? Or the hardware vendors, which produce components that don't conform to the software specs?

Kevin Tolly's Sony Vaio wasn't working properly, so he assumed the problem must be the software. He mentions Sony support, but he doesn't blame Sony for the problem: He picks on Microsoft.

I'm not saying Microsoft is totally blameless, but way too many nontechnical people don't understand the difficulty of electronic fabrication and manufacturing and make the mistake of ignoring how many of the problems with the operating system are due to hardware.

Michael Satyshur
Research physicist
U.S. Naval Research Lab
Washington, D.C.

Tolly responds: My Sony Vaio has the "Designed for MS Windows 98" logo, awarded by Microsoft, displayed on it. If Sony's hardware can't run Windows 98, why did Microsoft award Sony the logo? If Sony can't put together the proper system, Microsoft should have denied the use of the logo. If Sony gets the logo, ipso facto, the hardware can't be to blame.

Because Microsoft owns "the system" (that is, the operating system), only Microsoft can tell us what is wrong when individual hardware components misbehave.

OMEGA MAN

Your story about convicted computer saboteur Tim Lloyd ("The Omega files," www.nwfusion.com, DocFinder 9125) raises important issues regarding corporate ethics. Most network administrators are responsible; however, it is important they be screened properly. It helps if the administrator belongs to a professional organization such as the Institute for Network Professionals.

Although the Omega network was running NetWare, situations such as this one could have happened to any network operating system. The story points out how to solve the weaknesses rather well.

William Ramos
Senior technologist
Western Digitech
Miami

Your story "The Omega files" was great! It reads like a mystery — kept me on the edge of my seat. I appreciate your digging for details and have taken the story to heart for my network.

Rick Schroeder
Network manager
Independent School District 709
Duluth, Minn.

E-mail letters to jdix@nww.com or mail them to John Dix, editor in chief, Network World, *118 Turnpike Road, Southborough, MA 01772. Please include phone number and address for verification.*

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DocFinder 9122
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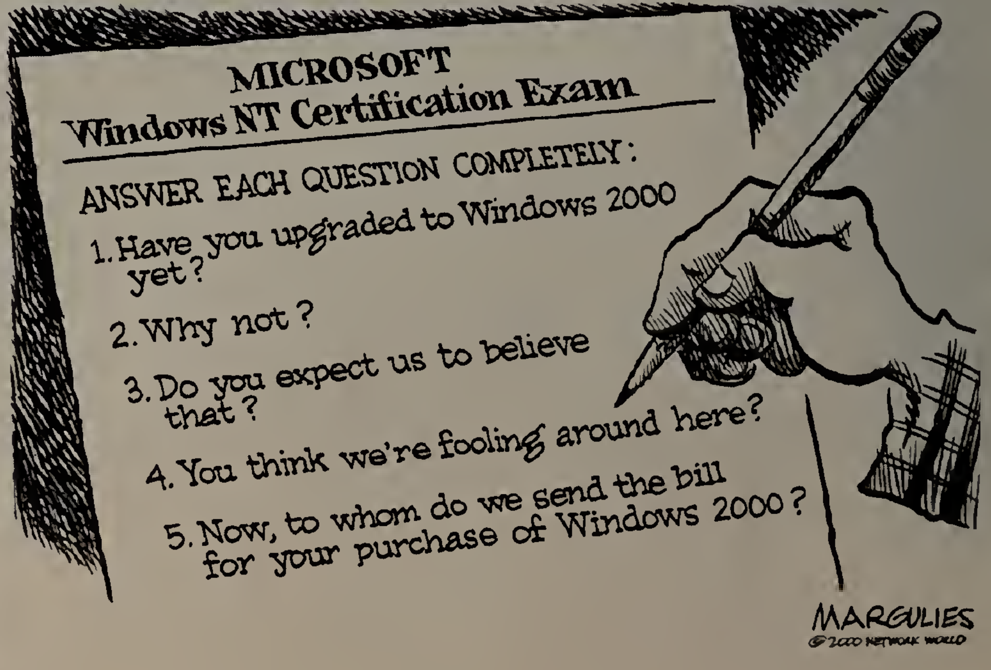
MICROSOFT
Windows NT Certification Exam
ANSWER EACH QUESTION COMPLETELY:
1. Have you upgraded to Windows 2000 yet?
2. Why not?
3. Do you expect us to believe that?
4. You think we're fooling around here?
5. Now, to whom do we send the bill for your purchase of Windows 2000?
MARGULIES
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In the Works . Paul Hoffman

THE PEN IS MIGHTIER THAN THE ELECTRONIC SIGNATURE

It's not often that you can get Internet legislation passed nearly unanimously in both Congress and the Senate, then signed with a flourish by the president. To some people, such a law must seem a truly wonderful thing, sure to bring peace and harmony and increased profits through e-commerce. To the rest of us, it's a sure sign the law doesn't do anything useful. Such is the fate of the new Electronic Signatures in Global and National Commerce, dubbed the E-Sign law.

The first tip-off to security experts that this law might be less than it seems is in the title. Notice that it uses the word "electronic" instead of "digital." A quick review of the law shows that, in fact, the new signatures do not have any security associated with them. This means that when you sign a document, you have no assurance that what you are signing is in fact what you think you are signing. Furthermore, the person receiving the signed document has no assurance that it was in fact you who signed the document.

In other words, a contract that is "signed" with an electronic signature is worth less than one on paper. It is approximately as valuable as an oral contract, where either party can later claim to have heard or said something different than what the other party says. If you sign a document by clicking on a button in a Web form, or even by sending e-mail, the receiving party can easily claim that what you clicked on or sent is different than the copy you kept on your hard drive.

Unfortunately, the E-Sign law is probably just another FEFL (full employment for lawyers) action by Congress. They could have easily done the right thing by saying that only digitally signed agreements, using the kind of security *Network World* readers have been using for many years, were legally binding. Crafting such a law isn't easy, but it's not impossible, either. It is certainly too soon to say "all digital signatures must use Secure Multi-purpose Internet Mail Extensions" or "all digital signatures must use Pretty Good Privacy," but a reasonable law could simply state "all digital signatures must use industry-standard formats and best practice security policies."

The general state of glee among those passing the bill was probably due to the promises of the lobbyists supporting the bill that this will be "good for e-commerce." That's not likely, given that the result will surely be less-than-scrupulous e-commerce sites starting to claim that users "signed" contracts that the users don't remember signing. Of course, these sites will have copies of the Web pages that the user clicked "OK" on, but nothing other than logs to prove the signature. This will end up in the newspapers, and maybe even the courts, and the result will probably be that most of the less-savvy users will trust e-commerce less than they do today.

Hoffman is director of the Internet Mail Consortium and the VPN Consortium. He can be reached at phoffman@imc.org.

Management issues . Tom Brophy

MANAGING HUMAN RESOURCES IS KEY TO LOWERING COSTS

If you're confused about which technologies to build your networks upon, you're certainly not alone. Network technologies and their economics are changing so rapidly it's difficult for most people to stay current, let alone implement and manage them. Most networks built within the last few years are homogenous, constructed around a technology such as frame relay or ATM. The proliferation of lower-cost access services such as DSL, cable modems, Web-based application suites, virtual workforces and the imminent mandatory detariffing of interstate services are changing that paradigm.

Selection of network technology should be driven by your organization's ability to understand the economics and integrate management of the technology. However, the cost of a network is not simply a matter of what you pay your service provider, but the overall cost of ownership. Managing any networking technology entails measurement and management of several key factors, such as network services, equipment, software, maintenance, security and people. While equipment and facilities are easily quantified, the human resource cost is not and can represent a significant portion of your total cost of ownership.

Don't underestimate the amount of time and effort required to design, procure, integrate, install and manage network technologies. Integrating these new technologies into your network may reduce your monthly outlay for services, but what is the cost of integrating and managing them over time? You may be surprised to find that retaining a well-trained staff proficient in integrating and managing this new hybrid environment is more costly than deploying it. In the long run, effectively managing your human resource costs is the key to lowering your total cost of ownership.

FRANCIS BLAKE

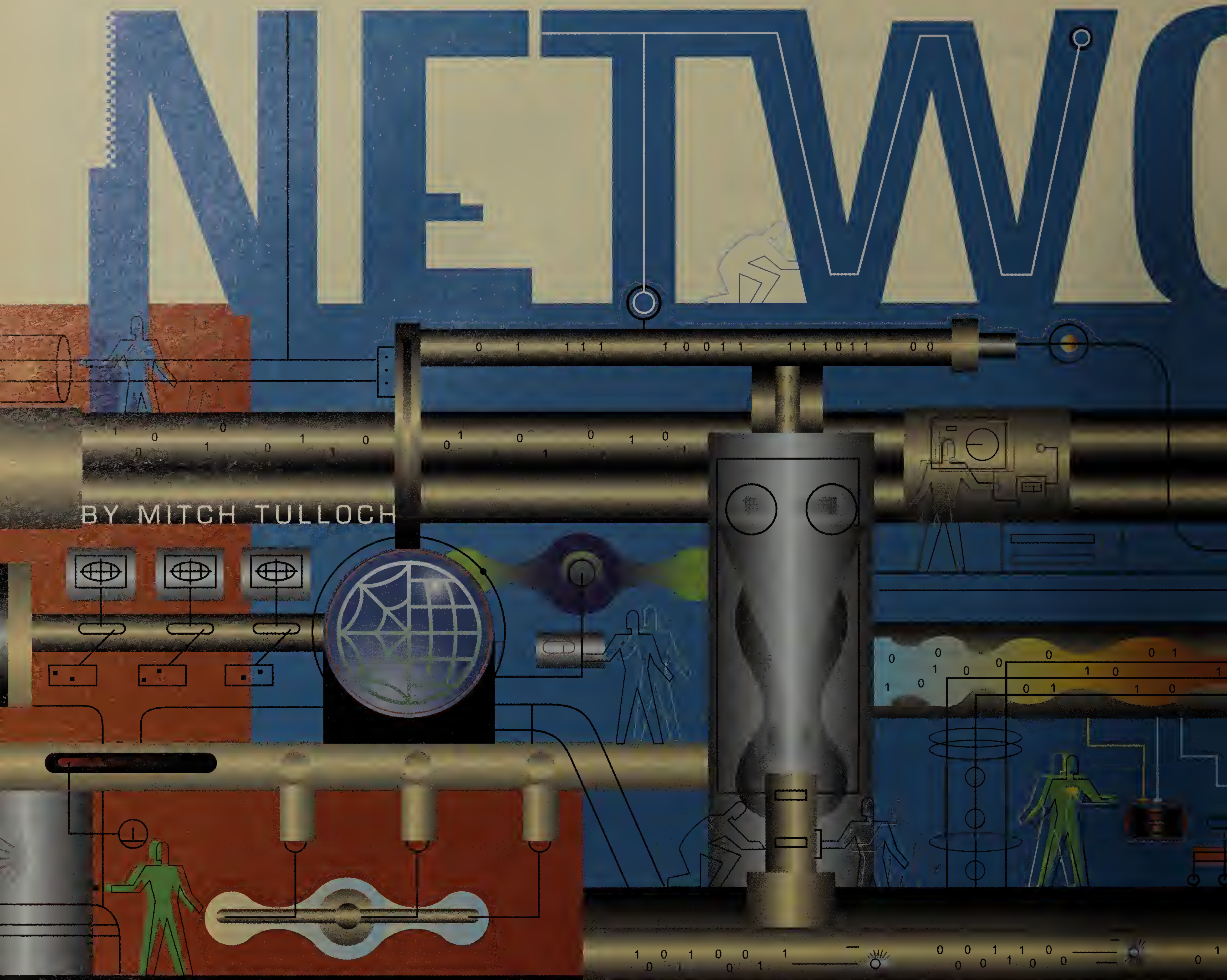
If you plot your resource needs as a function of time and skill set, you'll find that certain periods of the network life cycle require raw head count, and certain periods require specific skills. You'll need more people to deploy the network than to manage it once it's installed. You'll need expertise to negotiate new services or equipment procurement contracts, but that's required only once every few years. These are two specific areas that make sense to out-task to firms that specialize in these types of activities. In this way, you leverage resources that execute these activities continuously, with a plethora of experiences to draw upon. You also benefit by having your staff exposed to expertise throughout the process, making them better equipped to manage issues as they arise. In contrast, trying to maintain these resources in-house limits the experience base and increases resource cost.

If we apply the same out-task model to ongoing network management, leveraging expertise makes sense. As a network manager, I never felt compelled to learn from my own mistakes when I could learn from someone else's. There are now several network management firms that can successfully integrate once-homogenous networks with new technologies. I'm not referring to the traditional outsourcing vendors that assume your entire network and staff in huge multimillion-dollar deals. What I am advocating is the out-tasking of the daily break-fix, moves/adds/changes and surveillance activities required in every networking environment. By leveraging their expertise with the integration and management of these hybrid environments, you can effectively manage your resource costs and focus a smaller in-house staff on business-critical issues. The one thing you shouldn't out-task is how your business applies network technologies to meet your business goals. Answering these strategic questions and effectively managing your vendors to specific, measurable metrics is where you should focus your internal resources.

The deployment of network technology is not just about the technology. Like anything else, it must be managed properly in the context of your business goals and objectives. Sometimes the best way to meet your goals is not to deploy technology. Why deploy millions of dollars of new technology to attain a cost reduction when you could achieve the same result by renegotiating your service provider contract? Accordingly, trying to maintain a complete, well-trained and experienced telecom staff in-house is no longer viable. By carefully assembling a team comprised of internal and external resources with a broad skill and experience base, you can significantly improve your ability to successfully manage technologies and provide maximum benefit to your organization.

Brophy is president of NetPlus, a network consultancy in Parsippany, N.J. He can be reached at tbrophy@netplusinc.net.

NETWO



BY MITCH TULLOCH

TAKE A PEEK AT THE MASSIVE GIGABIT ETHERNET NETWORK THAT

Where can you find half the world's atomic particle physicists, the pressure and excitement of a dot-com, and dizzying challenges in networking and data processing? Located just outside Geneva and straddling the border between Switzerland and France, CERN (the European Organization for Nuclear Research) is the world's leading particle physics research institute.

CERN explores what matter is made of and what holds it together by accelerating electrons and positrons to a fraction under the speed of light and then smashing them together. CERN is also the place where Tim Berners-Lee invented the World Wide Web and early implementations of network technologies like Gigabit Ethernet were tested. *Network World* recently visited CERN to find out more about the network at the heart of this state-of-the-art facility.

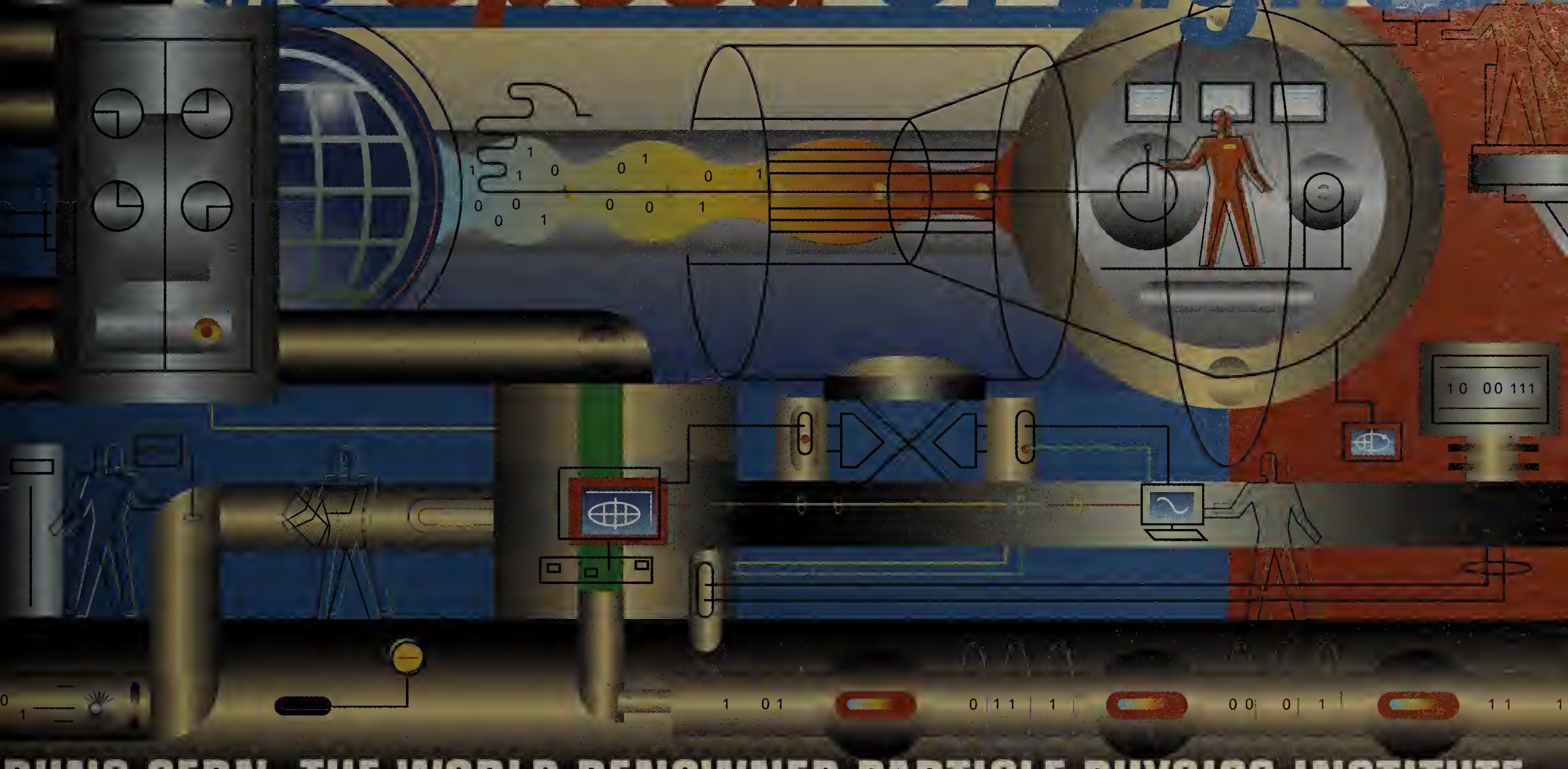
Evolution of a network

By the early 1990s, the CERN network had become unreliable and unwieldy. The network was flat and consisted of several 100M bit/sec FDDI rings, daisy-chained 10Base-5 and 10Base-2, and more than 7,000 directly connected nodes. "It was a nightmare," says Jacques Altaber, group leader of Communication Systems within CERN's IT division. "It had grown far beyond its capacity to serve the users."

Part of the reason the network was a mess was lack of centralized planning. "The physics people often built their own networks," Altaber says. "It was anarchy."

As a result, Communication Systems began several network upgrade projects to provide reliable shared 10M bit/sec connections across the campus. In 1994, the group began replacing the coaxial cable in its 300 buildings and

ORKING AT the Speed of Light



RUNS CERN, THE WORLD RENOWNED PARTICLE PHYSICS INSTITUTE.

labs with a structured Category 5 cabling system. Today, the campus has 25,000 LAN drops, which connect 15,000 systems. Altogether there are 1,500 hubs located at 70 distribution points across the campus.

Shortly after the cabling project began, IT also set out to convert the existing bridged network to a routed network. This resulted in 700 subnets implemented using 120 routers. The goal was to improve performance and reliability by isolating the backbone from users. Staffers implemented static IP addressing instead of Dynamic Host Configuration Protocol for greater control over the network.

To accommodate increasing traffic, in 1996 Communication Systems built a new switched FDDI backbone comprising 36 100M bit/sec FDDI rings interconnected using four Digital FDDI GigaSwitches to provide 3.6G bit/sec throughput. Cisco 4700 FDDI routers at the edge of the backbone provided distribution points to the cabling system.

By the time the network overhaul was nearing completion in 1997, however, new physics experiments were already stretching the capacity of the new FDDI backbone. For example, a single experiment alone generated 200 terabytes of data per year transferred at rates of 25M to 100M byte/sec over the backbone.

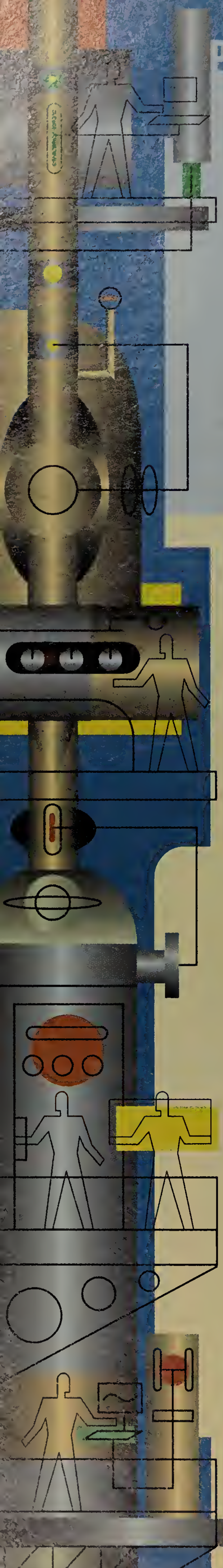
Moreover, network technology was evolving faster than expected. Fast Ethernet was becoming cost-effective for the desktop, and Gigabit Ethernet was beginning to emerge as viable backbone technology.

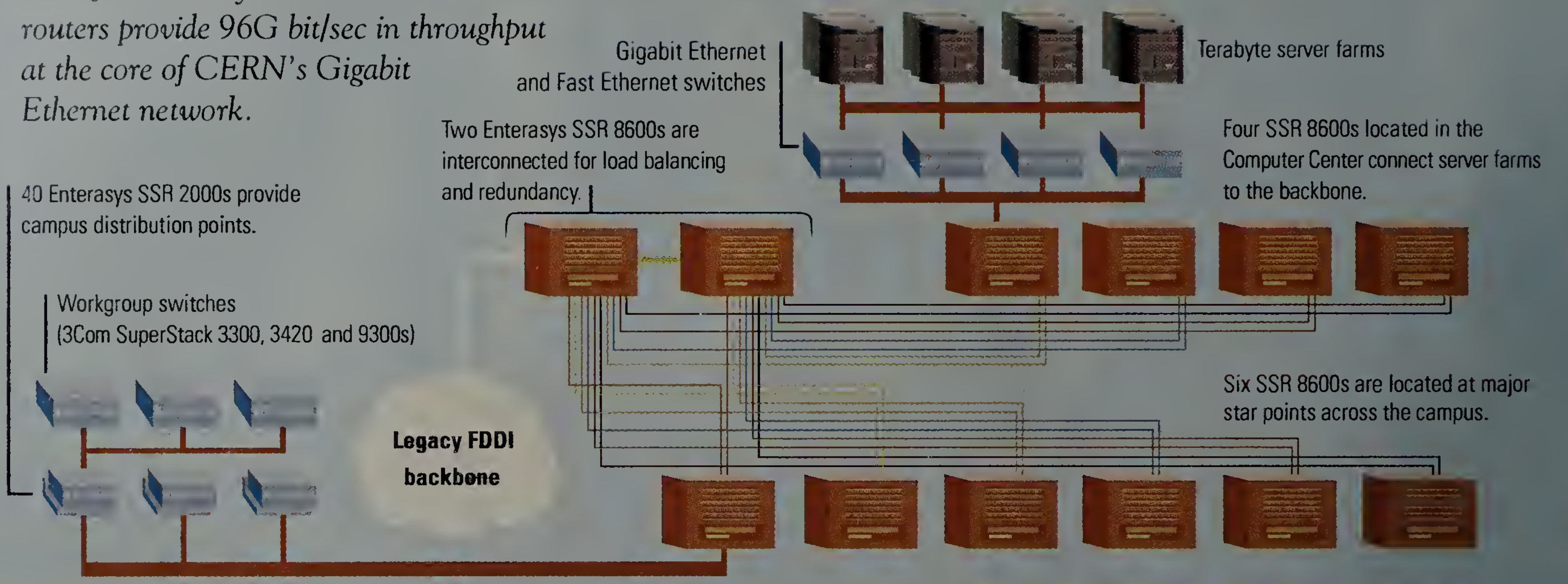
That August, CERN installed its first Fast Ethernet switch to support one of the experiments. It was such a success that everyone wanted it, and CS soon realized that mass deployment of Fast Ethernet would break the model of the existing FDDI-based backbone.

Upgrading the backbone yet again became a top priority. In January 1998, CS did a pilot implementation of Gigabit Ethernet to provide a single 7-kilometer-long, 1G bit/sec link between two buildings on campus, a distance record at the time. After the successful pilot, CS decided to upgrade the switched FDDI backbone to a fully routed Gigabit Ethernet backbone. "We decided on a routed network because we felt it is much easier to implement quality of service [QoS] in a router than a switch," says Jean-Michel Jouanigot, head of the campus network group and the person who is overseeing the upgrade. He intends to use multicast QoS to marry CERN's voice, video and data traffic in the future.

Along with the budgetary constraints typical for a publicly funded organization, CERN also had stringent technical requirements for a Gigabit Ethernet router. The product chosen needed to be inexpensive and support open standards and multiple protocols. It also had to be nonblocking and operate at wire speed and support multicast QoS.

The group decided that Enterasys Networks met all those requirements,




Gigabit Ethernet
and Fast Ethernet switches
Terabyte server farms
Two Enterasys SSR 8600s are
interconnected for load balancing
and redundancy.
Four SSR 8600s located in the
Computer Center connect server farms
to the backbone.
40 Enterasys SSR 2000s provide
campus distribution points.
Workgroup switches
(3Com SuperStack 3300, 3420 and 9300s)
Legacy FDDI
backbone
Six SSR 8600s are located at major
star points across the campus.

A dozen Enterasys' SmartSwitch 8600 routers provide 96G bit/sec in throughput at the core of CERN's Gigabit Ethernet network.

and chose its SmartSwitch (SSR) 8600 routers to form the core of the new backbone. In February 1999, Communication Systems upgraded the core FDDI switches to an FDDI/Gigabit Ethernet switch and installed the first few Gigabit Ethernet routers. CERN was on the cutting edge at that time because the standard for Gigabit Ethernet wasn't finalized until later that year.

The backbone is now made up of 10 SSR routers connected in a star topology to two central SSR 8600 routers. The central routers are linked together to provide load balancing and redundancy, and one of them is connected to the legacy FDDI backbone. Forty Cabletron SSR 2000 routers sit at the edge of the backbone, and those in turn are connected to workgroup switches such as the 3Com SuperStack II Fast Ethernet switch.

Communication Systems expects to deploy another four SSR 6800s and 20 SSR 2000s and phase out the old FDDI backbone completely by mid-2001. So far, the entire computer center and 30% of the CERN campus has been upgraded to Gigabit Ethernet, with the rest planned for completion by 2001.

The rollout is a lengthy process thanks to the constantly changing research environment. "Right now, we are getting something like 1,000 work orders per month," Jouanigot says. "The requirements of users are changing from day to day, which is the reason that we aren't using [virtual LANs]." But when an upgrade happens, it's done quickly. "Users have only a 90-second interruption as the backbone is switched over for their building or experiment," Jouanigot says. And so far, CERN has never had a problem with the new backbone.

Although the Gigabit Ethernet rollout isn't complete, Communication Systems is already looking toward 10-Gigabit Ethernet to provide the massive bandwidth needed for future experiments associated with a planned upgrade of CERN's particle accelerator. The group has already formed a working group to evaluate upgrading the present Gigabit Ethernet backbone to 10G bit/sec Ethernet. Another option being considered is 9.6G bit/sec Synchronous Digital Hierarchy using Packet Over SONET, but this is likely to be more expensive than 10-Gigabit Ethernet.

The work is never done

CERN's IT division also faces several other challenges before the new accelerator is turned on in 2005. Data processing is done by low-cost server farms based on dual-processor PCs, and there a dozen farms with about 100 processors per farm. However, in order to support the anticipated flood of data from the upcoming experiments, IT will need to expand these farms by a magnitude of 20 or more. This will require the construction of new buildings to house 25,000 more PCs.

Data storage will be another issue to tackle, as the experiments are expected to generate several petabytes of data per year. Finding the right technology to safely archive this data while keeping it online for analysis is a major challenge. "We would love a breakthrough in data storage technology," says Eric McIntosh, leader of the physics data processing department at CERN.

CERN now uses high-speed tape libraries for offline data storage and SCSI-based network-attached storage (NAS) systems. McIntosh is considering replacing the existing NAS systems with low-cost Integrated Drive Electronics (IDE) disk servers or a storage-area network.

And making data available to physicists around the world will pose yet another challenge. CERN has phased out most leased lines over the last several years in favor of moving experimental data over the Internet. CERN currently hosts two main WAN links to the Internet: a 40M bit/sec link to the Trans European Network, which is mainly for European academic and research traffic, and a 45M bit/sec transatlantic circuit to Chicago to connect physicists in the U.S. and Canada.

CERN plans to upgrade both links to 155M bit/sec, and will eventually boost the European link to 310M bit/sec.

All this work must be done with fewer and fewer people, due to budget cuts. CERN's IT division will reduce its staff by one-third over the next five years, mainly through attrition. As a result, IT is considering outsourcing more of its systems management and administrative functions and implementing service-level agreements.

And of course, CERN also faces the same IT recruitment challenges that plague the private sector. The organization especially needs Linux developers. Manuel Delfino, the IT division leader, hopes that by collaborating on projects with IT industry partners he can make CERN an exciting place for talented people to work. "Sometimes I joke that I'm trying to create an IT division dot-com at CERN, and some of the young staff are definitely energized by this concept."

How do all these challenges measure up? "Today, I believe we see the light at the end of the tunnel," Delfino says. CERN's IT department has made great strides over the last five years, and is looking forward to the challenges of the next five with lots of excitement and just a little bit of anxiety.

Tulloch lives in Winnipeg, Manitoba, and is the author of several popular IT books, including the Microsoft Encyclopedia of Networking. *He also has a background in physics. He can be reached at info@mtit.com.*

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Tools to tune your network

Lucent's VitalSuite is the tool of choice for solving application performance problems.

BY BARRY NANCE, NETWORK WORLD TEST ALLIANCE

Lucent

VitalSuite

VitalSuite is a superior performance problem solver and capacity planning aid. Its accuracy and support for a range of applications earns VitalSuite the Blue Ribbon Award for best application performance monitoring tool.

In a perfect world, your software vendor's (or your own company's) application programmers would understand the relationships among an application's consumption of computing resources and the available network bandwidth, server CPU speed, server disk speed and client CPU speed. Their grasp of these relationships would be so perfect that they could tell you, for a specific set of network components, computers and users working at a given time of day, the exact response time for a particular application transaction or other unit of work.

Unfortunately, the world is far from perfect.

More realistically, your staff might include a troubleshooter who tries to solve application performance problems by visiting users complaining of sluggish response times with a protocol analyzer under his arm. The troubleshooter measures response times, determines network utilization, identifies client and server CPU speeds, calculates disk I/O rates, draws pictures showing network links to the servers and gauges the per-unit-of-work capacity of the servers and network. The person then makes an educated guess to pinpoint the application's performance bottleneck.

As an alternative and better-automated approach to solving application performance problems, several vendors offer software tools that identify bottlenecks, determine capacity and gauge scalability. To help you decide which are the best tool to solve your organization's application performance woes, we invited vendors to submit their performance monitoring tools for this review. Our evaluation focused on software products that inspect network, client and server application behavior to find the causes of snags, stoppages and snarls.

We tested CompuWare's EcoScope 4.1, EcoTools 7.1 and an EcoScope WAN Adapter Hardware Kit, Lucent's VitalSuite 7.1, NextPoint Networks' S3 2.51, Ganymede Software's Pegasus, Response Networks' ResponseCenter 2.5 and NetScout Systems' AppScout 2.0.

Lucent's VitalSuite proved to be a superior, but pricey, performance problem solver and capacity-planning aid. Its high accuracy and support for a range of applications earns VitalSuite our Blue Ribbon Award for best performance monitoring tool.

The Vital solution

Surprisingly easy to use in light of its complexity, VitalSuite is a well-integrated collection of software modules for monitoring network activity, ensuring WAN link service-level agreement (SLA) compliance and tracking application performance. It accurately pinpointed our deliberately caused bottlenecks in the Visual Basic client/server, Web-based search engine and other software we tested with (See How We Did It, page 52).

We especially liked VitalSuite's responsive and intuitive user interface. Furthermore, its flexible architecture impressed us with its ability to handle a variety of business application environments.

The suite includes VitalNet, VitalAnalysis, VitalHelp, VitalAgent, VitalAgent AutoMon and the Transact tool kit. VitalNet gathers information from SNMP-aware devices and desktop machines on which you've installed the VitalAgent client software, then relays the information to VitalAnalysis and VitalHelp.

NetResults

VitalSuite 7.1

RATING: 8.40 COMPANY: Lucent, (888) 767-2988, www.lucent.com **COST:** $44,000 for unlimited servers, 100 desktops and 50 network devices. **PROS:** Accurately pinpointed bottlenecks; full-featured network monitoring tool; intuitive user interface. **CON:** Pricey.

S3 Version 2.51

RATING: 7.30 COMPANY: NextPoint, Networks, (978) 392-2026, www.nextpoint.com **COST:** Starts at $15,000. **PROS:** Accurately pinpointed bottlenecks; good trend detection. **CON:** Interface was difficult to use.

Pegasus 2.2

RATING: 7.15 COMPANY: Ganymede Software, (888) 426-9633, www.ganymede.com **COST:** Starts at $25,000. **PROS:** Good platform support; both passive and active modes; easy-to-use script language. **CONS:** Didn't always identify bottlenecks; coarse granularity for setting service levels.

EcoScope 4.1 and EcoTools 7.1

RATING: 6.85 COMPANY: Compuware, (800) 521-9353, www.compuware.com **COST:** EcoScope starts at $19,500; EcoTools costs $695 per managed server. **PRO:** Pervasive support for a range of network-aware applications. **CON:** Needed to export data into a relational database for serious analysis.

AppScout 2.0

RATING: 5.95 COMPANY: NetScout Systems, (800) 357-7666, www.netscout.com **COST:** Starts at $12,500. **PROS:** Useful categorization of network traffic by protocol, location, server and client; simple, effective user interface with excellent online help. **CONS:** Requires NetScout probes; can't help find custom application bottlenecks.

ResponseCenter 2.5

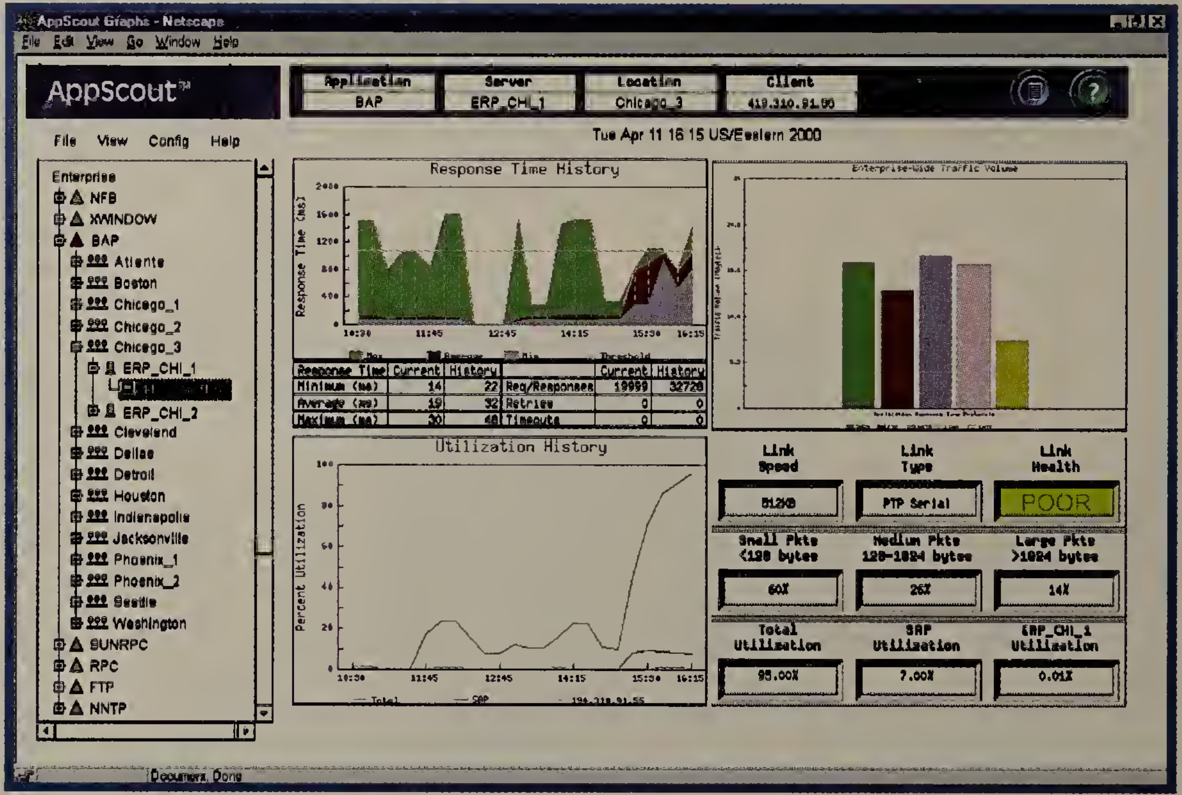
RATING: 5.45 COMPANY: Response Networks, (800) 677-7638, www.responsenetworks.com **COST:** Starts at $19,950. **PROS:** Identifies and measures certain TCP/IP and ODBC traffic well; easy-to-use interface. **CON:** Can't find custom application bottlenecks.

	Accuracy 25%	Reports 25%	Ease of use 20%	Manageability 20%	Installation 5%	Documentation 5%	Total score
VitalSuite	9	9	9	7	6	8	8.40
S3 Version	9	9	4	7	6	6	7.30
Pegasus	6	7	7	9	6	8	7.15
EcoScope/EcoTools	9	4	8	7	6	6	6.85
AppScout	4	5	8	7	6	8	5.95
ResponseCenter	4	4	8	6	6	7	5.45

Individual category scores are based on a scale of 1 to 10. **Percentages** are the weight given each category in determining the **total score.**

VitalAnalysis monitors applications and maintains a historical analysis of system and application performance and trends. For capacity planning and other purposes, it stores a year's worth of data in the included Sybase database or, optionally, in a Microsoft SQL Server database that you buy separately. VitalHelp assesses the health of TCP/IP-based applications, posting alerts to the network administrator when it determines the cause of a problem.

AutoMon is a script-driven synthetic transaction engine for generating network traffic that simulates an application's network traffic for measurement purposes. (The alternative to using synthetic transactions is a passive approach that watches the wire for an application's actual network traffic. Both approaches are useful.) The Transact tool kit lets programmers define unique business application transactions for VitalSuite to monitor. We found AutoMon and the Transact tool kit to be simple and straightforward, although both required rudimentary programming skills. AutoMon was particularly helpful when we tracked down a database-related bottleneck in our Web-based test application.



Response Time	Current	History		Current	History
Minimum (ms)	14	22	Req/Responses	19999	32720
Average (ms)	19	32	Retries	0	0
Maximum (ms)	30	48	Timeouts	0	0

AppScout's graphic reports response times, utilization and traffic volumes to applications based on network protocols.

VitalSuite's key report, Heat Chart, made troubleshooting application bottlenecks a breeze with its at-a-glance identification of problems and their causes. Each Heat Chart displays a color-coded matrix of application performance factors and computing components, termed "resource classes." Each Heat Chart cell corresponds to a resource class and a performance metric. Heat Chart cells change color to indicate the health of the underlying computing resources that comprise the corresponding resource classes. For example, if VitalSuite detects excessively slow response times for Sybase database transactions, the Heat Chart cell defined by the intersection of "Sybase" and "effective transaction throughput" turns from green to red.

VitalSuite reports application performance data in three views, Business, Applications and Reports. Customizing the Business view as either My Vital or My Business is a configurable preference, with each view a different way of looking at performance metrics from application and network statistics. My Vital typically presents a network-centric view of performance, while My Business is most often an application-centric view. The My Vital personal Web page is highly configurable and uses password protection.

The Applications view groups tab-indexed information into categories such as domains, groups, clients and servers. Each tab index displays network-related application performance criteria, including lost packets, round-trip delays, availability, response time throughput and client, network and server delay times.

The Reports view is a high-level menu of available reports, categorized by job description. These descriptions include management, application monitoring, network monitoring and capacity planning. To show application performance trends, VitalSuite's planning report uses a simple trending arrow, pointing up or down, along with the current average, one-month, three-month, six-month and one-year utilizations. It offers only a relatively small number of preconfigured reports, but setting up new reports is easy. Moreover, linking the reports to show increasing levels of detail takes just a few mouse clicks and makes the reports effective and useful.

The VitalSuite installation process provides a hint as to the product's complexity with all the questions it asks and options it offers. Lucent's comprehensive documentation is a joy to use.

Synthesizing a solution

Like VitalSuite's AutoMon engine and Transact tool kit, S3 synthesizes transactions to artificially create conditions it can measure. For almost all Web-based applications (via a Web traffic interception module) as well as several well-known applications, such as PeopleSoft, SAP R/3 and Exchange, S3 comes with preconfigured transaction monitors that you configure and launch to find performance problems. To uncover problems with our custom-written vertical-market software, we used S3's API to build our own synthetic transactions. The API supports both user-defined plug-ins, which are custom-written synthetic transactions S3 can track, and Application Response Monitoring-enabled applications based on the joint IBM/Hewlett-Packard ARM standard.

The process is simple and well-documented, and after less than a day's programming, we had S3 monitoring our Visual Basic insurance rating application. The Web traffic interception module made quick work of monitoring our Web-based search engine's performance troubles. In each test, S3 correctly identified the bottleneck we'd deliberately created. However, VitalSuite's synthetic transaction tools were easier to use, and we found S3's user interface more difficult to navigate and operate than VitalSuite's. S3's menus didn't always provide quick access to the tasks we needed to do, and the product's use of names and IP addresses was inconsistent and confusing.

S3 has two significant strengths: its ability to detect variances from a baseline it develops from repeated exposure of the application simulation, and how it can predict performance (and identify trends) by analyzing historical data. NextPoint calls this baseline data "traffic signatures." Each signature represents application performance as a set of minimum, maximum and average response times.

S3's reports disclosed exactly the information we needed to solve performance bottlenecks in our application environments. For capacity planning, S3's performance predictions uncovered trends early and accurately in our tests.

Installing S3 is straightforward but tedious, and the online documentation is only adequate.

Scoping the problem

Out of the box, Compuware's EcoScope and EcoTools supported the widest range of applications. The extensive list of applications includes Oracle, SQL Server, Sybase Adaptive Server, Exchange, Lotus Notes, PeopleSoft and even a smattering of SNA-based software products. We especially liked the ability to define applications and business functions in EcoScope Interactive Viewer by associating and naming groups of specific software, server, client and network components.

EcoScope and EcoTools focus on application uptime, time to return to service after a failure and response times. Using data from software probes running on Windows NT, NetWare and Unix machines around the network, EcoScope and EcoTools span the Open Systems Interconnection reference model from the network layer through the application layer to decode all the major network protocols.

The probes gather information on network utilization, traffic patterns and application response times. EcoScope uses the information to establish baselines of utilization and response times. The probes additionally act as sentries by sending traps to an SNMP management tool when baselines are

Continued on page 50

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exceeded.

To monitor application performance, the probes passively monitor application network traffic to determine average and maximum response times for user-selectable transactions. In addition, EcoScope monitors Web site usage by measuring traffic volumes and response times for a given URL.

This passive approach supplied us with performance data from the running of the application, which meant we didn't need to use synthetic transactions to simulate application performance problems. On the other hand, this approach also meant EcoScope and EcoTools had to be active any time the application might experience a problem.

EcoTools' Java-based console can remotely manage only some EcoTools functions. We had to use the native Windows interface to configure the monitoring tasks. Conversely, while the Windows interface can show only one statistical chart at a time, the Java-based console impressed us by graphing and displaying multiple charts simultaneously.

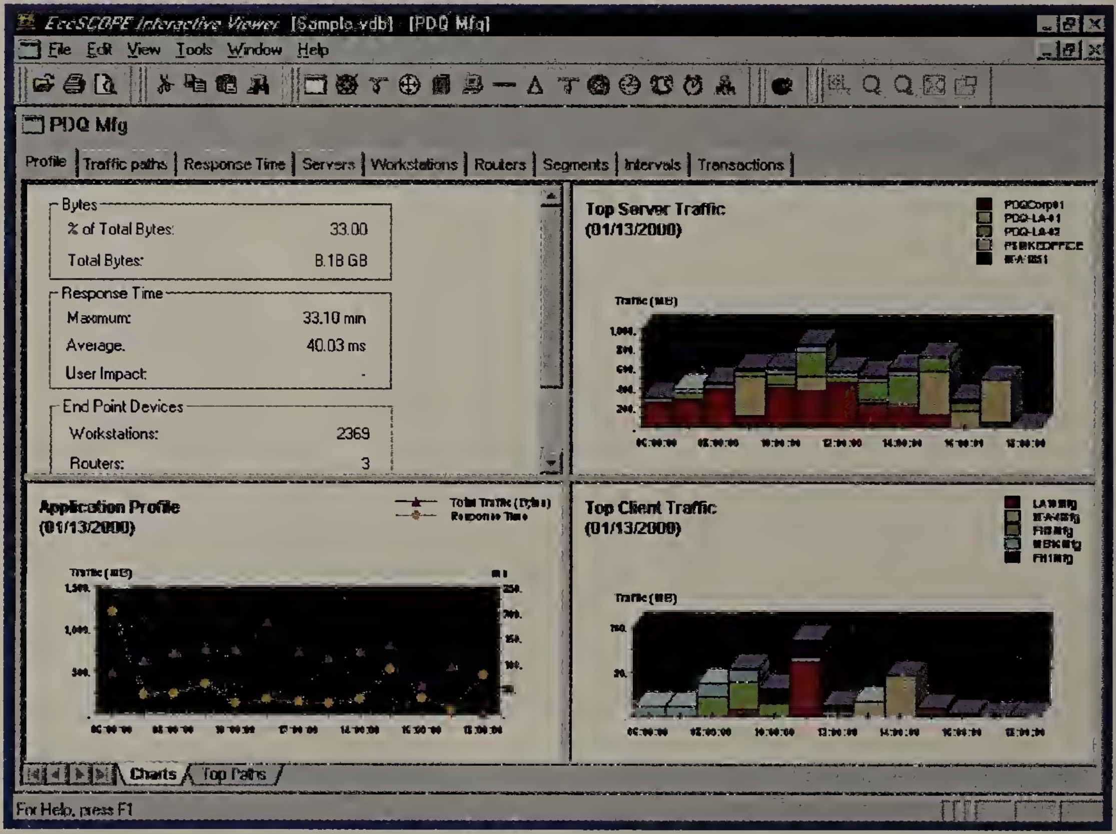
We were disappointed that EcoScope and EcoTools offered little in the way of historical reports. While the capacity planning and trending features are excellent, we had to manually export EcoScope data into a relational database to use query tools for advanced analysis of our historical data. Compuware suggests using a reporting aid, such as Seagate Software's Crystal Reports, for seriously studying the EcoScope and EcoTools data.

Installing EcoScope and EcoTools is complicated only by the need to distribute the software probes around the network. Compuware's installer even automatically enables Active Server Pages (ASP) in Microsoft's IIS Web server if ASP isn't already installed. All the detailed, technical documentation is online. Only an installation and quick start guidebook accompanies EcoTools.

A stellar approach

Ganymede's Pegasus impressed us with its support for many platforms. Its probes (Ganymede calls them endpoints) run on MVS; various flavors of Unix; Linux; Windows 3.X, 95, 98 and NT; NetWare; and OS/2. The endpoints are exceedingly small, which makes them highly unobtrusive on client computers. Their network use was similarly well within acceptable limits. We were delighted that each endpoint was able to automatically update itself when a network administrator decided to install an upgrade. However, we found removing endpoints more difficult than installing them.

Pegasus takes a bimodal approach to performance monitoring — it can emulate an application's use of the network by timing its transmission of synthetic transactions, or it can eavesdrop on existing application-specific traffic. In both approaches, Pegasus detects trends and signals existing or impending performance deviations by applying automatically calculated thresholds. Collectively, the deviations make up what Ganymede calls the Pegasus Severity Index. This index didn't always correctly identify the exact source of our deliberately caused performance problems. In one test, we flooded a subnet with excess traffic through a router. Pegasus singled out the right subnet but nominated the wrong router as the gateway through which the traffic flowed onto the net.



Bytes
% of Total Bytes: 33.00
Total Bytes: 8.18 GB

Response Time
Maximum: 33.10 min
Average: 40.03 ms
User Impact: -

End Point Devices
Workstations: 2369
Routers: 3

EcoScope's Interactive Viewer shows profiles of application behavior for chosen servers, clients and network segments.

Configuring Pegasus to synthetically mirror a custom application's network usage was straightforward, involving only the editing of application-specific scripts. Pegasus comes with more than 30 application scripts, and the script language is simple, powerful and well-documented. Each script, representing an actual network-aware application, generates synthetic network traffic that Pegasus measures. Pegasus stores the result in a central proprietary repository for baselining and reporting.

The granularity of setting service levels is rather coarse. Because each application script can have only one service level, the resulting trend data isn't as useful as it otherwise might be. We worked around this limitation by creating multiple application scripts for the same application.

The user interface lacks the flexibility and complexity of Vital Suite and S3. Those portions of the interface for viewing reports and network connections, called the Monitor Console, are accessible via a Web browser. The Pegasus reporting engine provides Web-based access to all reports, ranging from "Executive Overview" to in-depth statistics. However, most Pegasus configuration tasks, such as defining endpoints, identifying applications to monitor and designing reports, are available only through the Win32 user interface.

Installing Pegasus is a matter of establishing the server module on NT, setting up the Win32 configuration software on Windows 95, 98, NT or 2000 Professional, and deploying endpoints around the network. The documentation is a set of well-written manuals.

The right Response

ResponseCenter is a monitoring tool that generates and benchmarks synthetic customer transaction network traffic to detect performance problems. It does an excellent job of identifying and measuring common types of traffic, such as Open Database Connectivity, SQL Server, HTTP, FTP, Network News Transfer Protocol, POP3 and Simple Mail Transfer Protocol activity, but it is almost useless for tracking custom applications. ResponseCenter lacks the ability to synthesize application-specific network request and response messages.

The ResponseCenter probes were about twice the size of the Pegasus probes and did not support auto-updating. Updating the probes to a new version entails visiting each network segment and installing the new software.

To its credit, ResponseCenter's management console software quickly and correctly discovered the installed probes. The user interface is simple, uncluttered and intuitive. Setting up a ResponseCenter threshold is a matter of invoking the New Test wizard within its Explorer-like interface.

The wizard asks for the type of traffic to watch for, the type of agent to collect data from, the identity of a server to monitor and the specific event to use as a trigger (HTTP page receipt, for example). It then produces an application monitoring process you can schedule to run on a regular basis.

The ResponseCenter Win32 console displays graphical reports that can also be distributed as Web pages. The response time graph shows response times in user-selectable intervals, while the candle chart (vertical lines representing response time ranges, with the maximum value a line's topmost point and the minimum value a line's lowest point) displays mean, minimum and maximum response times along with standard deviation information.

A Status Grid report highlights multiple monitoring processes concurrently, and the throughput

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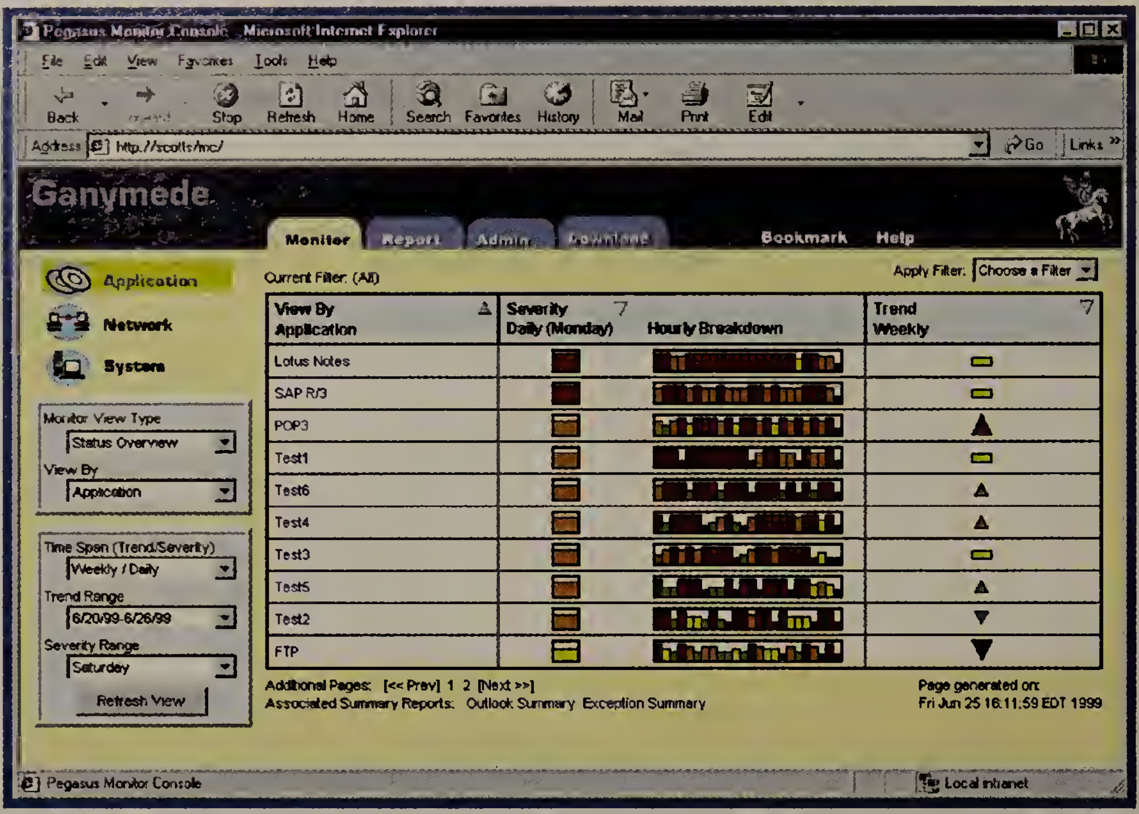
graph is a 3-D picture of response times and traffic volume for each time interval. Unfortunately, ResponseCenter doesn't offer the array of comprehensive, analysis-oriented reports that VitalSuite and S3 do. In particular, ResponseCenter needs predictive trend analysis reports.


Pegasus Monitor Console - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit
Address http://scotts/mc/
Go Links
Ganymede
Monitor Report Admin Download Bookmark Help
Application
Network
System
Refresh View
Pegasus Monitor Console
Local intranet

Monitor View Type: Status Overview
View By: Application
Time Span (Trend/Severity): Weekly / Daily
Trend Range: 6/20/99-6/26/99
Severity Range: Saturday

Current Filter: (All)
Apply Filter: Choose a Filter

View By Application	Severity Daily (Monday)	Hourly Breakdown	Trend Weekly
Lotus Notes	■	▨	▭
SAP R/3	■	▨	▭
POP3	■	▨	▲
Test1	■	▨	▭
Test6	■	▨	▲
Test4	■	▨	▲
Test3	■	▨	▭
Test5	■	▨	▲
Test2	■	▨	▼
FTP	■	▨	▼

Additional Pages: [<< Prev] 1 2 [Next >>]
Associated Summary Reports: Outlook Summary Exception Summary
Page generated on: Fri Jun 25 16:11:59 EDT 1999

The Pegasus Monitor Console report offers an easy-to-understand view of application response time trends.

Except for the need to distribute ResponseCenter probes across the network, installation is unremarkable. The three-ring binder start-up guide whets your appetite for detailed information but fails to supply it.

Scouting for slow applications

Like ResponseCenter, NetScout Systems' AppScout is a protocol-oriented rather than application-oriented performance monitoring tool. It can accurately and quickly tell you the volumes and generic types (such as FTP, HTTP, SMTP and SAP) of traffic crossing your network, but it can't pinpoint bottlenecks for custom-written applications. To use AppScout to solve an application performance problem, you'll need considerable expertise in how the application uses the network as you analyze AppScout's reports. Because AppScout requires the presence of NetScout SNMP probes on the various segments of the network, it's an appropriate accompaniment to the Netscout Manager Plus product.

AppScout is based on Application Response Time Management Information Base technology. It collects network utilization data from the probes you've dispersed on the network and displays the result by protocol type, location, server and client. Publishing AppScout reports as Web pages is easy to set up, and protecting the content of the Web pages with passwords is an easy process.

We loved its simple but effective user interface, which has an expandable tree view window of network nodes on the left and multiple results panes in the main window. The results panes can be an enterprise view, an application view, a server view, a location view or a client view. The enterprise view reveals aggregate network volume for all application traffic, the application view shows server utilization and response times, the server view pictures activity for a specific server and the client view identifies network activity for individual clients.

AppScout's online help is especially comprehensive and informative. The printed documentation, which explains the installation and initial use of AppScout, is brief but clear. Installing AppScout is easy and takes almost no time at all.

Making applications hum

If you live in a perfect world, where your network-savvy application programmers have an intuitive grasp of performance considerations and your skilled troubleshooter only needs a pencil, paper and a protocol analyzer to solve problems, you may not need any of the tools reviewed here.

Everyone else should give VitalSuite a try.

Nance, a software developer and consultant for 29 years, is the author of Introduction to Networking and Client/Server LAN Programming. *He can be reached at barryn@erols.com.*

NetworkWorld TEST ALLIANCE

Nance is also a member of the Network World Test Alliance, a cooperative of the premier reviewers in the network industry, each bringing to bear years of practical experience on every review. For more Test Alliance information, including what it takes to become a member, go to www.nwfusion.com/alliance.

How We Did It

Our physical test environment consisted of six Fast Ethernet subnet domains connected via Cisco and Ascend routers. We used two custom-built vertical market applications plus miscellaneous office productivity, e-mail, Web server and database query tasks as a framework for finding the best performance monitoring tool. The two custom-built applications consisted of a two-tier Visual Basic automobile insurance rating package and a three-tier Web-based search engine process for querying a financial database.

For each test, we programmed a specific performance problem into each application or consumed a known amount of network bandwidth by creating a network traffic jam of generated packets. We then pretended to not know the cause of the problem as we asked each tool to determine why the application slowed down. The problems we caused included server and client CPU consumption, voluminous server disk I/O and excessive network utilization. We expected each tool to measure these resources, identify an application's bottlenecks and help us tune the application by suggesting we reprogram it, add computing capacity or both. We also wanted these products to help us recognize application-related network congestion, gauge application capacity and estimate scalability.

We looked for each tool to gather comprehensive metrics regarding the performance of client/server or Web-based applications and show exactly which network or computing resources the application was consuming. To solve our performance problems and let us view an application's behavior from a performance standpoint, each tool needed to discover, measure and track application response times and specific application network traffic loads.

We ran the performance monitoring software products on three Gateway NS-8000 computers with 333-MHz Pentium II dual processors, 512M bytes of RAM and three 9G-byte SCSI RAID drives. In each case, the operating system platform was Windows NT Server 4.0 with Service Pack 5.

The relational databases that participated in the tests were Oracle8i, Sybase Adaptive Server 11.5 and Microsoft SQL Server 7.0. The 25 client computers on our network were a mix of Windows 2000 Professional, NT Workstation 4.0, Windows 98, OS/2 Warp 4.0 and Macintosh System 8 platforms.

Network Associate's Sniffer protocol analyzer software with Database Module Options for Sybase and Oracle, running on a Dolch PAC63 computer, generated packets as well as decoded and displayed network traffic.

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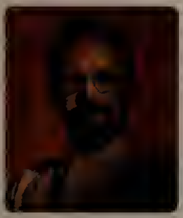

Every month, *Network World* Editorial Director John Gallant brings together opinion leaders on all sides of the hottest IT issues. Like whether ASPs are right for you. Whether convergence is for real. Even whether there's really anything you can do to prevent a hack attack. The Networked World cuts through the hype to show you what's true and what's nonsense. Other regular features include Executive Editor Doug Barney, with his own take on today's top IT news; Paul McNamara, with the NetBuzz everyone will be talking about; and Mark Gibb's irresistible version of IT Backspin. The only opinion that's missing is yours. To participate in this free live webcast, reserve your space now at www.ITworld.com/itwebcast/nw.

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TOP ISPs

Here's our latest quarterly report from *Network World* and Visual Networks (www.visualnetworks.com) as we look at the top ISPs in the market. Through statistical analysis of Visual's Internet BenchMark data for dial-up service (see How We Did It, right), we ranked the top ISPs in the business-to-business, national and regional categories, as they compare to other vendors within the same market. We've also included results for the past six months, to show whether an ISP's ranking this month has spiked or is consistently above average.

In June, AT&T's WorldNet service dominated the national retail market, performing above the industry average in seven out of nine categories tested. BellSouth and US West took top honors in the regional retail market, and AT&T's Global Network Service and Concentric took the lead in the business-to-business market. As always, you can check out monthly reports on Network World Fusion (www.nwfusion.com).

QUICK TIP BY VISUAL NETWORKS

When the V.90 protocol was introduced, many called it the last modem protocol that would ever be developed. But before the first quarter of 2001 has ended, an improvement to the V.90 standard could be available. The new standard, V.92, will let users increase their upload speeds, cut the time it takes to connect and allow the suspension of their connection for incoming phone calls without breaking the session.

When V.90 was approved, it took advantage of pulse code modulation (PCM), which uses an analog line to send a set of discrete signals that change at the same rate as the phone switch analog-to-digital converter. The theoretical maximum for such a download is 56K bit/sec. The upload channel used V.34bis techniques, but because of the energy used in the download signal, uploads were limited to a lower speed than with a V.34bis modem. Users sending large attachments or modifying images on Web pages took longer with a 56K bit/sec modem. V.92 attempts to address this problem by using PCM on the download and upload channels.

Who benefits from V.92? If you only have one analog-to-digital conversion between your computer and ISP (for example, people who get V.90 connects today), if you currently upload a lot of data, if you only want one phone line, or if you want to start your connections quicker, V.92 might be for you.

JUNE 2000 TOP ISPs, BY CATEGORY

ISP	Score*	Strengths
National retail		
AT&T WorldNet	20	Low CFR %** (all three), initial modem connect speed, average time to log on, average Web throughput
MindSpring	13	Average time to log on
Regional retail		
BellSouth	13	Low CFR % (24-hour)
US West	13	Average download time
Business-to-business		
AT&T (GNS)	15	Low CFR % (evening-hour), initial modem connect speed, average Domain Name System lookup time
Concentric	15	Average Web throughput, average download time
PSI Net	13	Low CFR % (business-hour)
*12 = average		**CFR = call failure rate

MONTH-TO-MONTH COMPARISON

ISP	Jan.	Feb.	March	April	May	June
AT&T WorldNet	17	17	19	16	18	20
AT&T (GNS)	14	13	12	13	11	15
Concentric	12	13	16	14	15	15
BellSouth	13	13	11	12	11	13
MindSpring	13	12	12	9	13	13
PSI Net	11	11	9	7	11	13
US West	13	12	12	13	12	13

INDUSTRY AVERAGES FOR JUNE 2000

Category	National retail	Regional retail	Business-to-business	Top ISP in this category
24-hour CFR %	3.5%	3.5%	3.4%	BellSouth
Evening-hour CFR %	4.4%	4.5%	4.2%	BellSouth
Business-hour CFR %	4.3%	5.2%	4.1%	BellSouth, Ameritech
Initial modem speed (K bit/sec)	48.1	47.97	48.12	AT&T WorldNet, UUNET (GridNet)
Average time to log on (seconds)	29.73	31.45	31.35	AT&T WorldNet
Average DNS lookup (msec)	517	865.45	639.08	AT&T (GNS)
Average Web throughput (K bit/sec)	4.43	4.84	4.76	Concentric
Average download time (seconds)	22.35	22.84	23.8	AOL
Average total Web fail/timeout %	0.6%	0.5%	0.6%	Ameritech

HOW WE DID IT

The data for this report comes from Visual Networks. Through its Internet BenchMark data, Visual rates national, regional and business-to-business ISPs according to several factors, including call failure rate, modem connect speed and Web download performance.

We took the data from Visual and applied statistical analysis to rate the relative performance of each ISP.

First, we derived the standard deviation of the numbers in each performance category. Standard deviation is a measure of how far the numbers in a series diverge from each other.

For each category in which an ISP performed better than one standard deviation from the industry mean, we awarded it one point. If the ISP did better than two standard deviations from the mean, we awarded it two points.

Similarly, if an ISP did worse than the industry mean by more than one standard deviation, we took a point away from its score. If it did significantly worse, meaning two or more standard deviations, we took away two points. We started with a baseline of 12 points, so if an ISP scores 0 points they end up with an adjusted score of 12.

After we scored each category, we totaled the results to get a number that indicates the reliability and performance of each ISP.

A rating of 12 means an ISP was about even with its peers, or the industry average. In June, seven ISPs scored higher than 12 and six ISPs were average.

A list of all ISPs tested, as well as an archive of previous reports, appears on Network World Fusion (www. nwfusion. com).

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Message management

Network pros offer advice for keeping your e-mail in-box under control.

BY TONY KONTZER

Kevin Miles of ebizmix.com knows how to pare down his in-box.

STEVE CURTIS

Kevin Miles might be the most efficient e-mail user around. As chief technology officer for ebizmix.com, a Kansas City, Mo., online marketplace for specialty retailers, Miles receives as many as 75 e-mails per day.

While that's not an unmanageable number, it's enough to keep many people's in-boxes cluttered and eventually results in a number of directories stuffed with old messages.

But Miles, who uses Lotus Notes, says he has about 100 archived messages, a stark contrast to the throngs who keep all pertinent messages handy just in case. Miles' golden rule: He only keeps a message if it's likely to be useful during the next year.

"I try to take action, delete it and move on," he says.

While Miles spends one hour per day sending and receiving e-mails, he is the exception to the rule. According to Ferris Research, a San Francisco firm that has been compiling statistics on workplace e-mail usage, American workers with access to corporate e-mail are spending an average of 2.2 hours per day reading 19 messages and sending another 14. Ferris projects that within a year, workers will spend 2.6 hours per day reading 34 e-mails and sending 23.

David Ferris, the firm's research director, says the increasing amount of time workers spend on e-mail is causing them to work longer hours. The problem, he says, is worse among IT professionals.

Miles manages his e-mail by breaking his incoming messages into three groups: action items, such as internal communication or customer interaction; informational messages, such as administrative updates or research; and junk.

The key is the swiftness with which he answers everything that requires a response. By keeping his e-mail flow under tight control, Miles ensures it never becomes an obstacle to his productivity.

"As much as I'd like to say e-mail is a nuisance, it's not," he says. "It clearly helps facilitate communication."

Golan Zohar, a technical manager for Whale Communications in Fort Lee, N.J., a network security software vendor, agrees, although his approach to managing e-mail is different. Zohar receives a more manageable 30 e-mails per day, but spends about 30% of his time reading, responding to and managing his e-mail.

That's because he is an e-mail pack rat with thousands of messages archived for convenient reference.

"I save everything, and I almost never delete my trash," he says. "You never know."

Zohar goes to great lengths to make his mailbox manageable. In addition to employing a system of multiple directories — for filing messages by topic, product, sender and so on — he set up Microsoft Outlook's built-in rules to route messages to the appropriate folders automatically. Zohar points out all this work is necessary given the growing role of e-mail in workplace communications.

"Everything is done via e-mail," he says. "If you want to purchase something, you send an e-mail. If you need to travel, you send an e-mail. If you want to have a meeting, you send an e-mail. If you want to *talk* with someone, you send an e-mail."

Miles and Zohar have it easy compared with Karey Barker. Barker, director of network systems for global public relations firm Fleishman-Hillard in St. Louis, says she spends 80% of her day reading, sending, looking for and referring to e-mails. She estimates she receives as many as 150 e-mails each day.

Barker relies on filtering software to weed out spam and has programmed her Outlook rules to automatically sort incoming messages by sender or subject. Just as important is the diligence with which she manages her in-box throughout the day.

"I like to keep my in-box clean," Barker says. "Otherwise, it makes me feel very unorganized."

Barker says Fleishman-Hillard educates its staff on managing e-mail. Among the practices it recommends to employees:

- Act immediately on messages, whether that means responding, filing or deleting.
- Empty deleted and sent items folders daily.
- Participate in internal training sessions on using and getting the most out of e-mail software.

Dana Gardner, an analyst with Boston's Aberdeen Group, says organizations will need to be proactive about making the management of e-mail a priority as the volume of messages continues to rise. He predicts companies in larger numbers will outsource Web-based e-mail as such services introduce more robust management tools.

Despite the gloom-and-doom predictions about e-mail's affect on IT workers' lives, Zohar chooses to accept what's coming rather than brace for it.

"I don't see a need to combat this," he says. "Why fight the future?"

Kontzer is a freelance writer in San Jose. He can be reached at tony@goodink.com.

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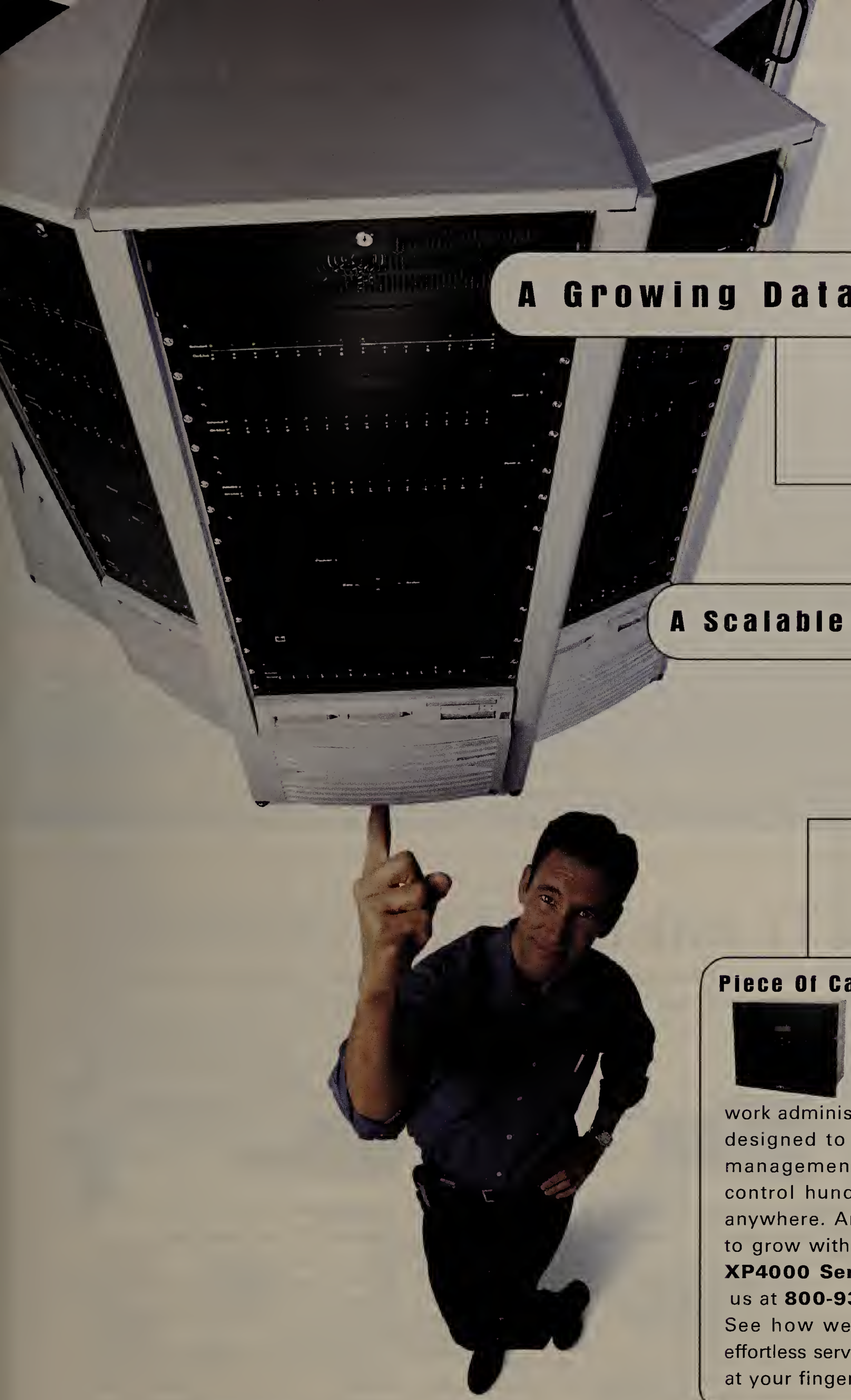

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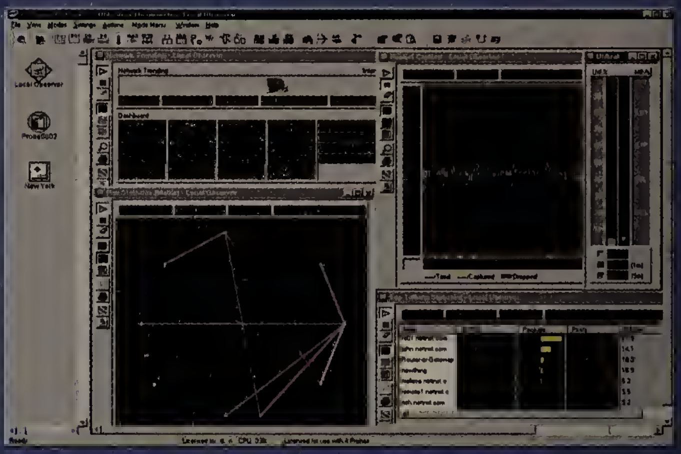

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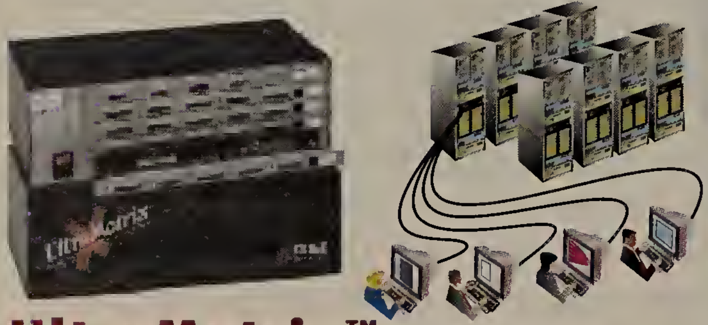

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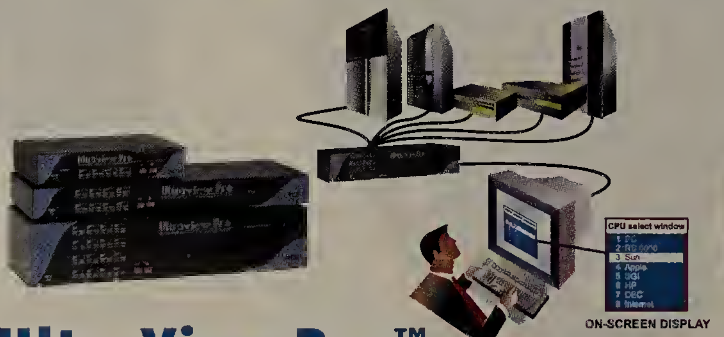

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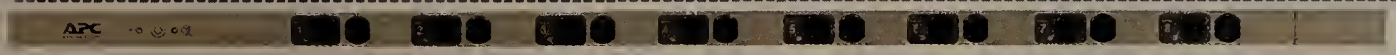

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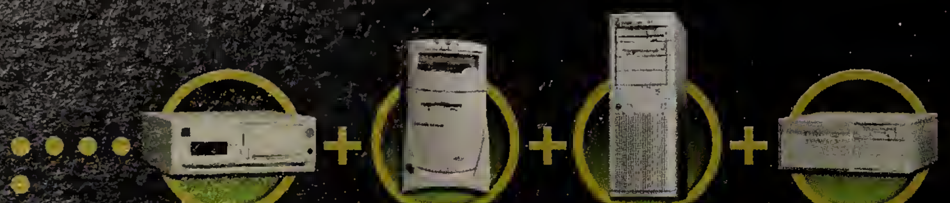

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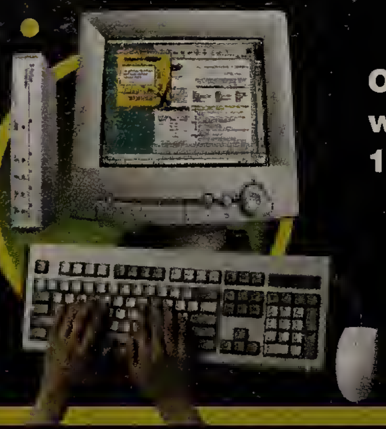

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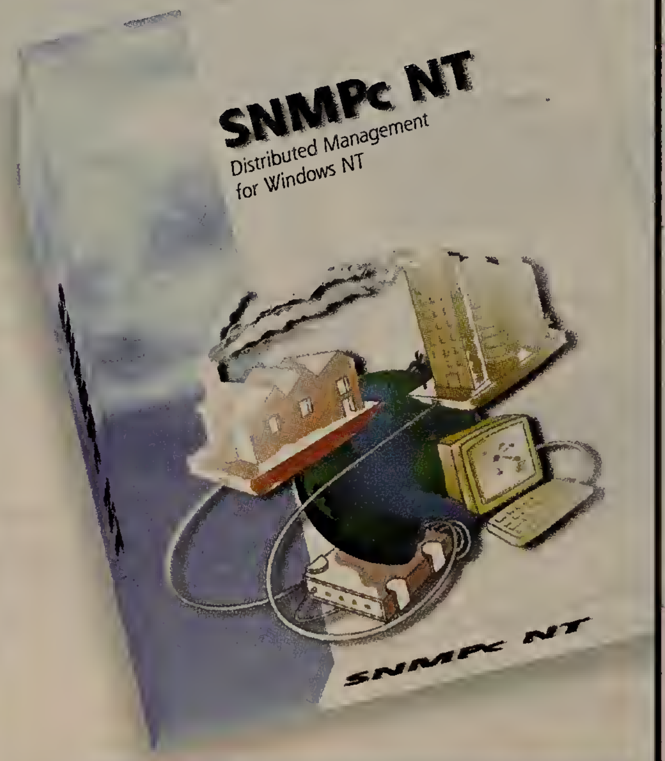

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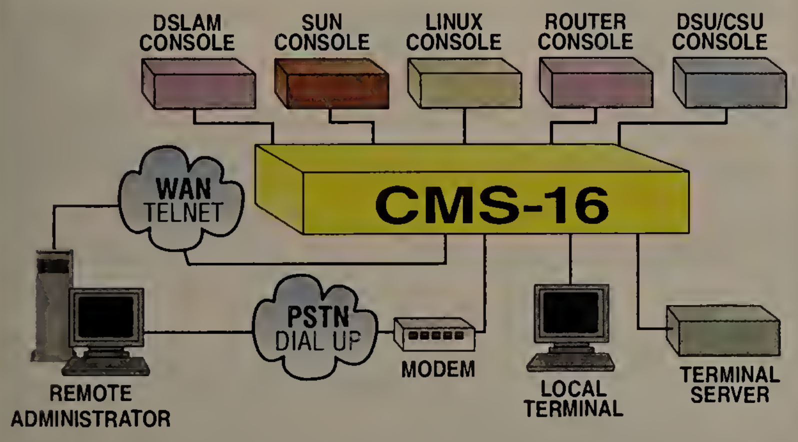

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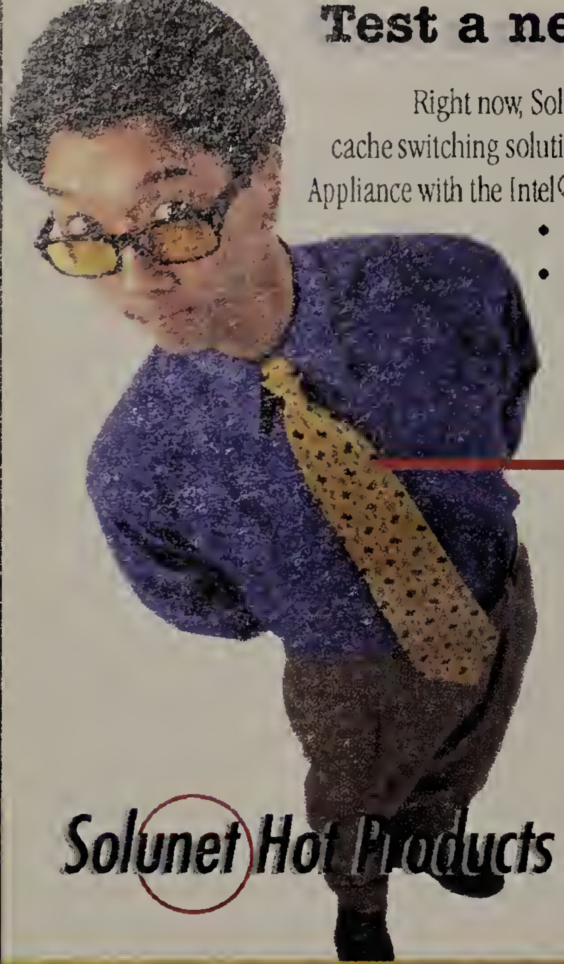

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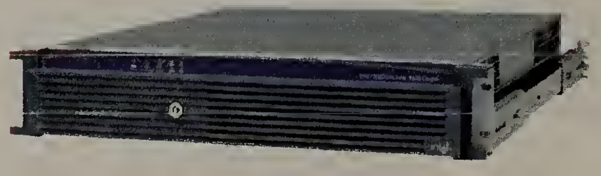

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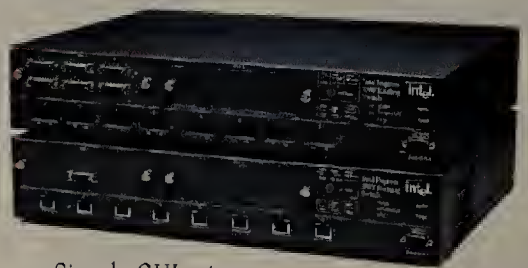

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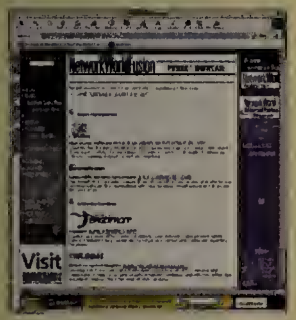

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Software Engineer to research, design & develop computer software systems for manufacturing and other industries applying principles & techniques of computer science, engineering & mathematical analysis using various operating systems, C, C++ & OTHER PROGRAMMING LANGUAGES. Req. B.S. or Engineering degree in Computer Science/equivalent plus 6 yrs of exp. or Masters/equivalent in Computers & 2+ yrs. of exp. 18+ months exp. in C, C++, DOS, OS/2, UNIX, MS Windows, VAX/VMS & AIX. $70,000 p/a, Send resume to Playekar Companies, Inc., 1959 East Third St., Williamsport, PA 17701.

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- ★ DESKTOP TECHNICIAN
- ★ SYSTEMS SUPPORT MANAGER
- ★ SYSTEM SUPPORT ANALYST
- ★ SENIOR SYSTEMS SUPPORT ANALYST
- ★ SYBASE DBA
- ★ SENIOR HL7 INTERFACE PROGRAMMER
- ★ SYSTEMS PROGRAMMER
- ★ BUSINESS SYSTEMS ANALYST
- ★ COMPUTER OPERATOR
- ★ SENIOR/LEAD COMPUTER OPERATOR

HealthStar Network offers an exceptional compensation package that you would expect from an industry leader. For consideration, please send/e-mail your resume indicating position of interest and salary history, to: **Michael Pagliaro, Senior Vice President/Human Resources, White Plains Hospital Center, Davis Avenue at East Post Road, White Plains, NY 10601; E-mail mpagliaro@healthstar.org** Equal Opportunity Employer M/F.

HEALTHSTAR
NETWORK

Senior Software Engineers (multiple openings): Design, develop and implement software systems to determine feasibility of design and directs software testing procedures, programming and documentation using relational database management systems (RDBMS). Work involves extensive travel and frequent relocation. Must have 1 year of experience using 1 from Group A and 2 from Group B **OR** 1 from A and 1 from B and 1 from C **OR** 1 from A and 2 from C. A) DB2, FoxPro, Informix, Ingres, MS-Access, Oracle, Paradox, Sybase and Unify; B) AIX, DOS, HP-UX, MVS, Novell, OS/2, Sun OS, UNIX, VAX/VMS, Windows; C) 4GL, APT, C, C++, COBOL, Case Tools, C Shell, Crystal Reports, E-SOL, Easytrieve, JAVA, ODBC, PowerBuilder, PowerDesigner, Power J, Power++, S-Designer, SOL, Shell Script, Visual Basic. Master's degree in one of several limited fields: Computer Sci/Apps, Eng., Chem., Math, Physics or a scientific or business related field. Will accept Bachelors degree with five years of progressive experience as computer professional. Salary: $75,000 per/yr, 40 hrs/wk, 9:00-5:00 p.m. Please submit resumes to: Mr. Terrance Kinney, Manager, Armstrong County Team PA Careerline, 1270 North Water Street, P.O. Box 759, Kittanning, PA 16201-0759. Job Order No: WEB 101926.

Systems Analyst (Burlington /Boston, MA): Participate in all the phases of system development life cycle, & lead the development team. Prepare specifications by effective user interaction using CASETOOL like BACHMAN, database design, development, testing and implementation of business systems and applns based on functional requirements in Mainframe & Client - Server environment; on IBM Mainframes such as IBM 3090 using MVS as OS with CICS, VS COLBOL II, CSP, DB2, IDMS, VSAM JCL, TSO; Data conversion from Mainframe to Client-Server using Oracle database on UNIX as OS, SOL*FORMS 3.0, SOR, PRO*C, Developer 2000 (Forms and Reports); user interface and training; provide enhancements, technical support, maintenance and documentation for the developed s/w. Master's degree in Comp. Sci., or Comp. Engg., or Electronics or Electrical Engg.; or Bachelor's degree with 5 yrs. of progressive exp. in the job offered. 40 hrs/wk, 8am to 5pm, $55,993/yr. Pls send 2 copies of resume to Case# 19992470, PO Box# 8968, Boston ,MA 02114.

[redacted]

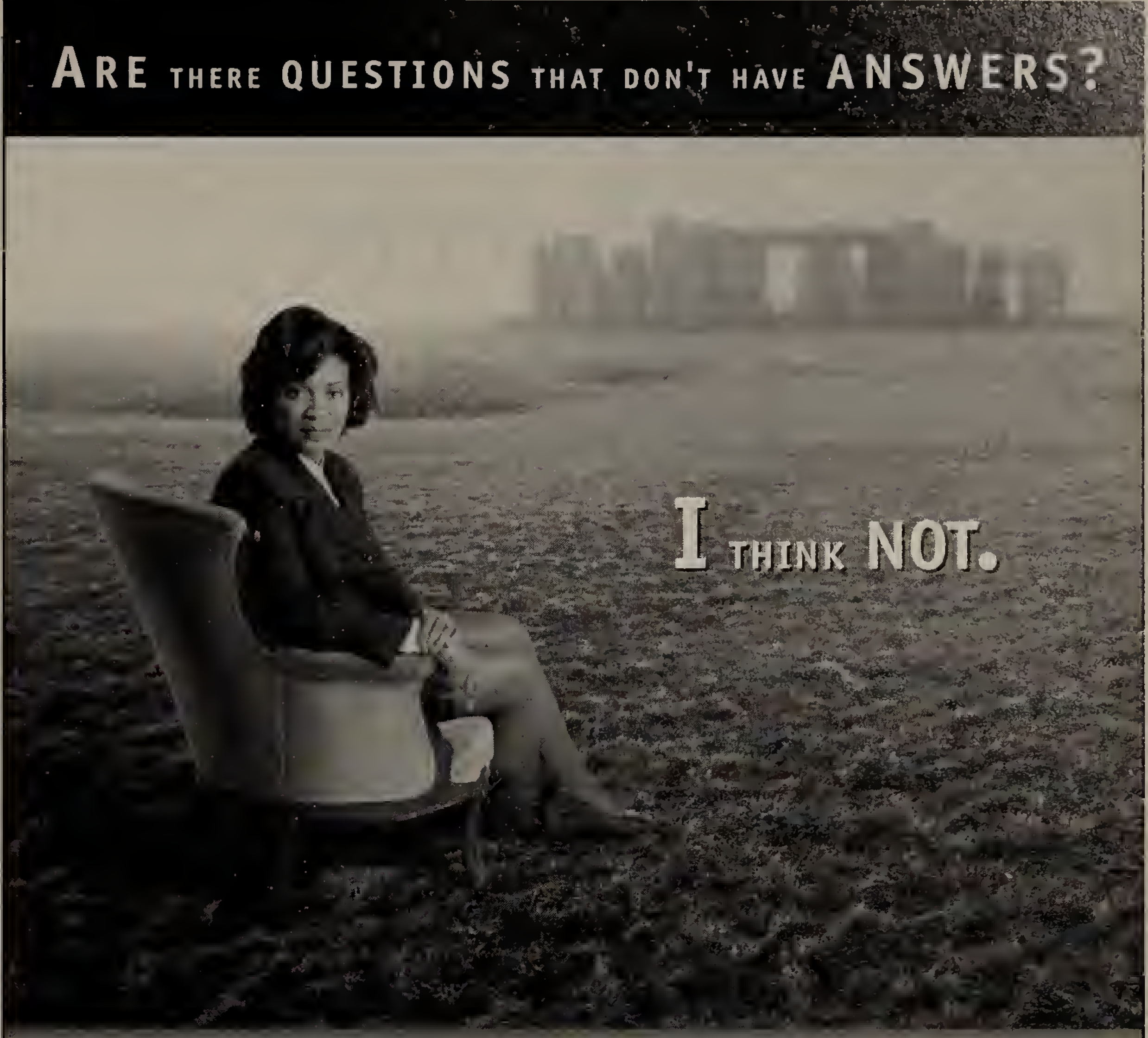
Senior Software Engineer and Software Engineer positions available to design, develop and implement software systems to determine feasibility of design and to direct software testing procedures, programming and documentation. Candidates must have one year of experience in job offered or as a computer professional. Some positions require additional year of experience in a particular skills set (see below). Bachelors or Masters degree, or foreign equivalent, is required in one of several limited fields: Computer Science/Apps, Engineering, Chemistry, Math, Physics, or scientific or business related field. In lieu of Masters degree, Bachelors degree, or foreign equivalent, with five years of progressive experience will be accepted. Work involves extensive travel and frequent relocation. Salary ranges from $70,000 to $120,000 per/yr depending on skill set and experience, 40 hrs/wk., 9:00-5:00 p.m. Please submit resumes to: Rapidigm, Jaime Lopez, 4400 Campbells Run Road, Pittsburgh, PA 15205.

RDBMS: Informix, Oracle, FoxPro, Sybase, SOL Server, Progress;
Oracle RDBMS: Designer 2000, Developer 2000, Oracle RDBMS, SQL*Plus, Pro*C, PL/SOL, SOL*Forms, SOL*Reports, SOL*Loader, Oracle Forms, Oracle Reports, SOL*Menu, SOL*DBA, SOL*Net;
GUI: Windows 95/98/00, Windows NT, Visual C, Visual C++, C, C++, Visual Basic, PowerBuilder, MFC, Crystal Reports, COM/DCOM, CORBA;
Mainframe: IBM3090, IBM ES900, MVS, IMS, CL/400, CICS, TSO, VSAM, COBOL, JCL, AS/400, DB2, VAX/VMS, MVS;
ERP: PeopleSoft, SAP, Baan or Oracle Applications/Financials/ Manufacturing/HR;
Internet Applications: ASP, HTML, Java Script, Java, Coldfusion, Broadvision, ATG Dynamo, Netdynamics, Websphere, Java Beans, Front page, CGI, Pearl, MTS, IIS;
CRM: Siebel, Clarify, Oracle CRM, SAP CRM;
DBA: Oracle, Sybase, Informix, SOL Server;
Unix/NT Administrators: Sun Solaris, IBM RS/6000, DG-Digital, SCO Unix, Windows NT Administrators, HP9000, HP UX, IBM AIX, IRIX.

ASSOCIATE SOFTWARE ENGINEER: Utilize theoretical knowledge of programming languages, computer architecture and organization and computer networking to develop Web interface for electronic commerce; to write HTML templates which follow the interface of mainframe; to create dynamic page using Jsp Servlet based on the MVC model; to manage the design, development and implementation of reusable applications utilizing UML, Together/J, XML, EJB and WebLogic; to analyze applications to ensure that programs meet project requirements in the areas of application performance, correctness, usability and availability; to implement design specifications in object-oriented programming languages; test, maintain, upgrade and debug programs; train and assist applications users; and draft computer-based training manuals. Must have a Master Degree in Computer Science. Must have either university level coursework or experience in Object-Oriented Design; C++, Java Programming; Unix Operating system; Oracle; and Web Technology. 40 hours per week, 9:00 a.m. to 5:00 p.m., Monday to Friday. Must have proof of legal authority to work in the United States. Salary Range: $66,789.00 and up per year. If interested, submit resume in duplicate or in person: Mr. Fred A. Cassidy, CoreCommerce, 1600 Parkwood Circle, Suite 525, Atlanta, Georgia 30339.

Software Engineer and Senior Software Engineer Positions to design, develop and implement software systems to determine feasibility of design and directs software testing procedures, programming and documentation. Work involves extensive travel and frequent relocation. Must have one year of experience in job offered or as a computer professional as well as one year of skills in field. Bachelors or Masters degree in one of several limited fields: Computer Science/Apps, Engineering, Chemistry, Math, Physics, or scientific or business related field. Will accept Bachelors degree with five of progressive experience. Salary: $65,000 to $105,000 per/yr, 40 hrs/wk., 9:00-5:00 p.m. Please submit resumes to: Rapidigm, Jaime Lopez, 4400 Campbells Run Road, Pittsburgh, PA 15205.

RDBMS: DB2, Informix, Oracle, FoxPro, MVS, Novell, UNIX, VAX/VMS, Windows, APT, Crystal Reports, C, C++, COBOL.
Oracle RDBMS: Designer 2000, Developer 2000, Oracle RDBMS, Oracle Applications, SOL*Plus, Pro*C, PL/SOL, SOL*Forms, SOL *Reports.
GUI and Internet Applications: Windows 95, Windows NT, Visual C, Visual C++, C, C++, Visual Basic, PowerBuilder, TCP/IP, HTML, MFC, CGI, MTS.
Mainframe: IBM3090, IBM ES900, MVS, IMS, CL/400, CICS, TSO, VSAM, COBOL, JCL, AS/400
PeopleSoft, SAP or Baan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To apply for these Information Systems positions, please send resume to:

Blue Cross and Blue Shield of Montana
Attn: Human Resources
PO Box 4309
Helena, MT 59604
Or
visit our web site at www.bcbsmt.com

Blue Cross and Blue Shield of Montana offer market based pay, pay for performance, and excellent benefits. For more information about our company or these position, visit our web site www.bcbsmt.com Information regarding employment opportunities can also be acquired by calling our job information line: 1-800-447-7828 ext. 3410

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Senior Consultant (Denver, CO): Consult with clients to define need or problem; analyze requirements and data to advise on and recommend solutions; design, develop, implement, code, test, maintain, and document client-server software applications for the telecomunications business sector utilizing object-oriented design, Visual C/C++, Windows NT, and UNIX. Bachelor's degree in Computer Science or Engineering required. Two years experience in the position or two years as a Consultant and/or Programmer Analyst designing applications for the telecommunications industry required. 40 hrs/wk.; 8:00 a.m. - 5:00 p.m.; $80,000/yr. Send resume to: Colorado Department of Labor and Employment, Employment Programs, Job Order #: C04665013, Attn: Jim Shimada, Two Park Central, Ste. 400, 1515 Arapahoe St, Denver, CO 80202-2117. NO CALLS. AN EMPLOYER PAID AD.

Senior Consultant (Denver, Co): Consult with clients to define need or problem analyze requirements ana data to advise on and recommend solutions; design, develop, imlement, code, test, maintain, and document client-server software applications for the telecommunications business sector utilizing Oracle, Designer 2000, and Developer 2000, and object-oriented design.

Bachelor's degree in Computer Science, Engineering, or Mathematics required. Two years experience in the position or two years experience with Designer 2000 and Developer 2000. 40 hrs/wk.; 8:00 a.m. - 5:00 p.m.; $70,000/yr.

Send resume to: Colorado Department of Labor and Employment, Employment Programs, Job Order#: CO4665834, Attn: Jim Shimada, Two Park Central, Ste. 400, 115 Araphoe St, Denver, Co 80202-2117. NO CALLS. AN EMPLOYER PAID AD.

Senior Software Engineer sought by company in Denver, CO specializing in business software solutions to work in Denver & other unanticipated job sites in the US. At a senior level, design & develop client/server software applications &/or software tools that provide software application connectivity with relational database management systems, & are platform independent. Analyze requirements. Create designs & design documentation. Code, test, & de-bug the software applications. Use programming languages C/C++ in the design & development process. Provide technical assistance to Software Engineers. Requires Master's in computer science or related field; working knowledge of designing & developing client/server software applications, relational database management systems, & programming languages C/C++ (working knowledge may be gained through employment experience or in an academic program). 8am-5pm, M-F; $66,100/yr. 2 openings.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, #400, 1515 Arapahoe, Denver, CO 80202, & refer to Job Order Number CO4667506.

Software Engineer "Multiple Openings" wanted by Co mfg audio amplifiers in Costa Mesa, CA. Must have Masters in Comp Sci or Elec Engg.

Respond to: Renee Ray, Red Admin, QSC Audio Products, Inc., 1675 McArthur Blvd, Costa Mesa, CA 92626.

Software Engineer "Multiple Openings" req by provider of transaction based high volume production imaging workflow, internet connection document mgmt Co in Culver City, CA. Must have Masters in Comp Sci or Mechanical Engg. Respond to: Michael Brodsky, VP, Datamax Technologies, Inc, 6101 West Centinela Ave, Ste 345, Culver City, CA 90230.

Programmer Analyst (2 positions) – Plans, develops, tests and documents computer programs, applying knowledge of programming techniques in computer systems. Will design and implement computer based management system using CISCO routers, NT Networks and Novell Networks. Requires one year experience in NT Network and CISCO routers. 5 day, 40 hr/wk, $80,000/yr. Please mail resumes to Colorado Department of Labor and Employment, Employment Programs, ATTN: Jim Shimada, Two Park Central, Suite 400, 1515 Arapahoe Street, Denver, CO 80202-2117 and refer to order number CO4665837.

Client/Server Programmer wanted by S/ware Dvlpt & Consulting Co in San Jose, CA. Must have Bach in Comp Engg or foreign equivalent & 2 yrs exp dvlpg, encoding, testing, debugging, documenting & installing programs to support client/server s/ware systems & UNIX servers. Respond to: HR Dept, Asmasoft Inc., 90 N. First St, Ste #203, San Jose, CA 95113.

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Software Engineers
Expertise in Client/Server technologies ranging from ERP to B2B, Identifying Business Process, Analyzing entire systems integrity and performance. Must have Problem Solving Technical Skills, extensive knowledge in installations, upgradations and administration of systems, application packages and databases. Requires Masters Degree in computers or equivalent with 1+ years experience.

System Analysts
Expertise in Client/Server technologies in ERP, Identifying Business process. Designing and Developing entire ERP system. Extensive knowledge in at least one module of an ERP package (SD, MM, FA or PP). Must be thorough with upgradations functionally and technically in at least one module of application packages. Identifying, rectifying critical problems functionally and technically as and when required. Requires Bachelor's Degree or Related with 1+yrs experience.

Send your resume to Advent Global Solutions Inc., 17314 SH249, Ste 205, Houston, Texas 77064. Fax (281)970-3839 e-mail reply to: recruiter@adventglobal.com

Facilities Manager - Brookfield, IL - Manage car wash operations and employees including coordinating physical changes to computer data bases applying knowledge of data base management systems. Mon.-Fri., 8:00am-4:00pm, no O.T., $62,400.00/yr. 2 years in job or 2 years as a General Manager or Computer Operations Manager required. Applicants must show proof of legal authority to work in the U.S. Send resumes to: Illinois Department of Employment Security, 401 S. State St.-7 North, Chicago, IL 60605, Attention: Leonard Boksa, Reference #V-IL 22532-B. Send 2 copies of both resume & cover letter. An employer paid ad. No calls.

SAP Senior Basis Consultant Experienced in all phases of system development life cycles, including ASAP methodology. Must reside in Chicago area to provide 7x24 support to client. In-depth technical knowledge of UNIX/Oracle platforms, SAP R/3 versions 3.0F, 4.0B and 4.6B; SAP R/3 Banking version 4.01C; SAP BW version 1.2B and SAP communications using ALE. Respond by resume to: Jocelyn Freimark Symmetry Corporation Fax: 414-274-3111 E-mail: joc@sym-corp.com

Network Systems Engineers and Computer Professionals: National IP voice/data communications provider has multiple positions available for Network Systems Engineers and Computer Programmer/Analysts. Candidates should have the ability to work independently on multiple projects in a fast paced environment. The candidate must have a B.S. degree in Computer Science or related. Telecommunications industry experience a plus. Interested individuals respond with CV to: Human Resources, Nexbell Communications, 300 Lena Drive, Aurora, Ohio 44202. EOE.

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◆

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◆

Chicago State University Information Technology Division has an opening for a Director, Information Technology Support who can deliver technological services to the campus; troubleshoot network, database and architecture design with the Banner System; computer system security; plan and direct system integration and management.
Requirements: MS in Computer Science, hands on experience in Oracle Database & Unix Operating Systems, 3 + years management experience. 40 + hrs/wk.
Send letter of application, resume, three current reference letters to: EEO Office - ADM 317A, Chicago State University, 9501 S. King Drive, Chicago, IL. 60628. Applications will be considered until the position is filled.
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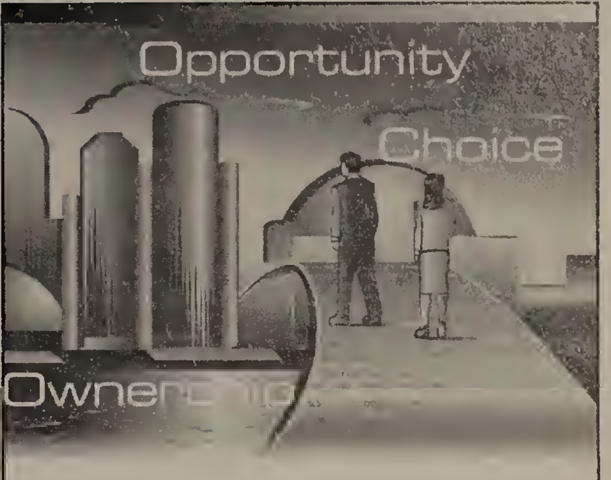

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DBA

- Oracle or Sybase
- DB2

Client/Server

- Siebel
- Websphere
- Com/DCom
- Web Architects
- Datawarehousing
- Informix, C or UNIX
- Oracle Developer or Designer 2000
- JAVA, HTML, Active X or Web Commerce
- SAP/R3, ABAP/4 or FICO or MM & SD
- Lotus Notes Developer
- Oracle Applications & Tools
- UNIX System Administrator
- UNIX, C, C++, Visual C++, CORBA, OOD or OOPS
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SENIOR CONSULTANT, COMPUTER CONSULTING IN AS/400, Synon and RPG environment. Require Bachelors Degree or equivalent in computer science or related field. Must have one year programming or systems analysis experience utilizing AS/400, RPG, and Synon resulting in extensive knowledge in area. Salary $50.00 per hour, 40 hours per week. Send resumes to Department of Work Force Services, Attn: Pat Redington, Job Order #3061024, 140 East 300 South, Salt Lake City, Utah 84111.

Computer Technology Consultants

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IT Careers in the Washington, D.C. area

If you accept the notion that the Internet was born in the bowels of the federal government, then you also can accept that Washington, D.C., remains not only a political hotbed but also a hotbed of information technology.

The growth of many of the original companies was based on business with the government, so when they began branching out into commercial applications, it seemed natural to stay in a geographic region where talent abounded and opportunities were exploding.

CSC Technology Management Group
Falls Church, VA

In 1959, CSC began as a government contractor. And while the company is headquartered in El Segundo, CA, its primary customer is on the opposite coast. "As we diversified into the commercial marketplace, we knew we had a base in Washington from which to leverage innovation and thought leadership," explains Lyn Burchfield, vice president of new business development. "Today there's still the government strength, but we've also achieved tremendous growth in our commercial and global business."

CSC's Technology Management Group is a full-service outsourcing business unit that supports information technology infrastructure and application development and maintenance for clients around the world.

Burchfield says assignments are available throughout the world, ranging from application design and development to SAP implementation to e-business solutions. "We work to match employees' skills and needs with ours," says Burchfield. "Within the New Business Development area, we are looking for senior people who will oversee the new business process, from the initial bid stage through the capture of new business, and who have the IT background to understand technology and outsourcing."

CSC manages large-scale applications and legacy systems, and provides system integration, management consulting and end-to-end e-business solutions globally for large organizations, Fortune 1000 companies and dot-coms. "For that reason there is a need for all the hot skills. But we also need people who are customer-facing, who understand the customer service role," adds Burchfield.

CSC employees have access to educational assistance, symposia and career enhancing activities, such as the Leading Edge Forum. "If you have an interest in a new technology, we allow you to work on that versus a traditional work assignment," Burchfield explains. "It's a way for you to advance in ways that interest you while helping the company. I believe the thing that pulls people into CSC is the people who are here," Burchfield says. "Even those people who leave oftentimes come back, because they like the people who work here. We have a great career development approach – I started as a programmer. Within CSC you have the opportunity to create your own career path. And of course the projects are among the best and most interesting in the world."

Network Access Solutions
Sterling, VA

Most of the companies who played a pivotal role in developing the Internet can be found in Washington, D.C. So it's good business for Network Access solutions to be close by, says David Casti, vice president for corporate strategic development. NAS provides DSL to its customers, the high-speed link that can drive down costs for businesses large and small. "The power of DSL is that it can reduce the cost of high-speed technology to users, whether individuals or businesses," says Casti. "There are just fewer components than with a T1 line, while allowing data to move just as faster or faster."

NAS is positioning itself to provide service to small, mid or large businesses using a data network. "We can come into your business and replace your traditional network with a DSL network that costs about half as much. You can use the same hardware as before, or we can upgrade you," explains Casti. "We can provide either a high security private enterprise network, or Internet connectivity at a steep discount over traditional technologies. This approach makes high speed networking much more affordable for everyone."

Founded in 1994 as a network integrator, NAS later added the resale of equipment, monitoring and management of equipment for after-market and buying network services to provide to customers. "Our vision is to be a one-stop shop, from concept through planning, equipment, network deployment and ongoing management," says Casti.

While the business is growing quickly due to the service it can provide, it also is expanding its geographic area. From the Northeast and MidAtlantic, NAS plans to expand into the Southeast, Rocky Mountains and West Coast. "We need people in sales, support and delivery. We are hiring at every level and are looking for people who may have skills but perhaps no telecommunications experience. We can provide that experience, as well as expand on existing skills."

NAS also needs IT support personnel. "This will be very important as we grow, to provide support to the market and to help us scale our company." Casti says the NAS culture is driven by its core value of customer satisfaction through offering the highest levels of quality and service reliability. "We tend to attract employees who share our values, who enjoy working with customers and who are comfortable in a business casual environment.

Currently NAS is headquartered in northern Virginia but has offices in Richmond, Columbia, Baltimore, Philadelphia, Pittsburgh, New York City, Boston and Delaware. "Because we are still a fast-moving and relatively young company, NAS provides the opportunity to work in a start-up environment," adds Casti. "We will be expanding into cities such as Denver, Seattle, Minneapolis, Atlanta, Nashville and Miami. Since we have been successful in the mid-Atlantic region, these new offices will have the support needed to help their operations succeed."

Key benefits to employees include the ability to take on a variety of responsibilities and gain exposure to the overall business. "We also provide DSL-enabled Internet to employees free of charge and at a significant discount for friends and family members," Casti says. "My staff joined NAS because it is a great place to learn, we recognize and reward performance, and we offer competitive packages even for this very hot D.C. market."

Sequoia Software
Columbia, MD

A little over two months ago, Sequoia Software went public. Recruiting at the firm remains in high gear with more than 70 individuals joining the company already this year. "We're doubling in size this year," explains Jennifer Spiegel, vice president, human resources.

Sequoia employees are excited about the launch of their new flagship product, Sequoia's XML Portal Server 3.0 OR XPS. "XPS is an e-business application our customers are deploying for business-to-business, business-to-employee and business-to-consumer portals and marketplaces, some of which support wireless devices like webphones and PDAs," Spiegel says. "Sequoia sells software, not services – we're a product development company, using Internet-standard technologies, and that's very compelling to a lot of talented people."

The company has positions open for software engineers and technical professionals with C++, COM, and ATL development experience. Sequoia is also hiring web developers with Visual Basic, ASP and GUI (graphic user interface) skills.

"Sequoia is a great option for anyone who wants to avoid the commute associated with working in Baltimore or the Washington, D.C. corridor," adds Spiegel. "We're developing next generation e-business software. People are eager to apply and extend their skills here. Less tangible is our rapid growth, which means everyone's work is highly visible."

In the wake of going public, Sequoia has established incentive programs, based on individual and company performance. "There are goals we all must achieve, and when they are met, rewards follow," Spiegel explains. "We anticipate solid growth during the third and fourth quarters."

For more job opportunities in the Washington, D.C. area, turn to the pages of IT Careers.

If you'd like to take part in an upcoming IT Careers feature, contact Janis Crowley, 650.312.0607 or janis_crowley@itcareers.net.

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Diversity & IT Careers

As one of America's youngest industries, information technology faces issues of diversity internally and externally to a greater degree than most. The labor market for technologically savvy people has never been tighter. At the same time, IT-based companies need the ability to appeal to the most diverse public and consumer ever – from how they design their products and services to how they market them.

America Online
Dulles, VA

Diverse expressions of ideas and individuality have been hallmarks of America Online since its inception. According to Ranell Durgan, AOL looks at valuing diversity as an internal and external concern. Within AOL, "our people bring a diverse background of talents, interests, insights and viewpoints to create a rich business," says Durgan. "We believe that human diversity is the key to innovation and the invention of powerful ideas."

Similarly, AOL reaches to new markets and diverse populations through its marketing and the way in which it expresses civic responsibility. Durgan says the AOL Foundation works to bridge the digital divide, working to empower under-served populations. "Our civic engagement focuses on fostering and improving communities, from online safety to education, philanthropy and healthcare access," she says.

With this multi-faceted approach, AOL continues to push forward on building a workforce that reflects an increasingly diverse consumer base. "We are talent driven, and we need diversity to ensure we can attract the best talent, anywhere," she says. "Having diverse talent and people is the magnet for attracting new talent."

AOL is hiring a wide range of employees, from executives to individual contributors across all of the company's businesses. "We are looking for people in marketing, sales, business development, technology, interactive content developers and programmers," says Durgan. "In the Internet space, a lot of hiring is just-in-time hiring so we are continuously in a recruiting mode."

In addition to technological and business competence, the company looks for people who are results focused and effective self- and time-managers. "Because we are a matrixed organization, you need to be a team player and partner effectively with others," adds Durgan. "AOL is a dynamic and fast-paced environment characterized by a lot of ambiguity, so you need to have the flexibility to operate effectively."

The company will continue to attract new employees, in large part, due to the brand and its leadership role with the Internet. "We give employees the opportunity to make a difference – your work matters here," says Durgan. "Because we are unique in many ways, we use the tagline – AOL, Unlike Anything, Anywhere – because no prior experience can fully prepare you for AOL. AOL-Time Warner will be the leading Internet and media communications company of this century."

Goldman Sachs
New York, NY

One of the business principles guiding global investment banking and securities leader Goldman Sachs states, "We make an unusual effort to identify and recruit the very best person for every job. Although our activities are measured in billions of dollars, we select our people one by one."

It's a guidepost that reflects how Goldman Sachs approaches diversity, with focus on attracting, retaining and rewarding the "very best people," explains Pamela Taylor, a vice president in the firm's Technology Division. Over the past few years, the company has developed flexible work arrangements, backup on-site childcare at some locations, parenting programs, and mentoring programs to help employees with their career development.

Taylor says that in 1999 the Technology Division began to address some challenges that related directly to diversity, including the recruiting of new employees. "The Technology Division has signed an unprecedented partnership with AMIE (Advancing Minorities' Interest in Engineering), establishing a partnership with North Carolina A&T State University to encourage and foster recruiting the best and brightest technology candidates," she says. The division also developed a Technology Careers Program with the Sponsors for Educational Opportunity (SEO), an organization that provides minority students with internship opportunities in a number of areas with leading financial services companies, as well as consulting and law firms.

"The biggest challenge that I envision is our ability to keep current with changes in the composition of the workforce," says Taylor. "These changes can lead to new initiatives that will help us attract and retain the best people."

Goldman Sachs' Technology Division looks for technology professionals who know the importance of their talents and skill, "and we give them many opportunities to enhance them, build on them and develop others," says Taylor. The company hires summer interns as well as new associates.

"To succeed at Goldman Sachs you must be bright, creative, highly motivated and a team player," adds Taylor. "I've been with Goldman Sachs for 15 years and have found that we always stress teamwork and professionalism in everything that we do, without stifling individual creativity."

Diversity and IT Careers

KPMG Consulting
McLean, VA

"While valuing diversity has long been part of KPMG Consulting's operation mode, the baseline of the efforts is in identifying, recruiting and keeping the best quality candidates we can find," says Keira Blazer, director of recruiting. "By the very nature of this challenge, we must look every place we can to find the most talented person. And the only way to attract top, diverse talent is to demonstrate that we do have a clear position on diversity and opportunities for everyone."

KPMG Consulting's leadership is diverse, she adds, and the reflection of a diverse-rich company begins with the KPMG web site. "We are looking for the full gamut of professionals," says Blazer. "Our vision as a company is to become the key Internet integrator in the marketplace. We are helping businesses come to fruition through Internet technologies, which requires just about every skill set – from analysis through development, implementation and full utilization."

Blazer is clear in her description of KPMG Consulting's business. "We operate throughout the world. We help businesses transform, but we also must provide the drive, the vision and the creativity needed for start-up businesses. We're helping new and old businesses build it, grow it and make it into something new."

Just as KPMG Consulting approaches clients as life-long relationships, so too does it approach its relationship with employees. "To be good at recruiting people to KPMG, I have to believe what I'm selling," says Blazer. "And that means selling a way of life, not a product. You will have the sense of belonging to a team here. You'll be able to move around the consulting group. There are opportunities for you to grow and develop, along the line of your own goals. If there's a technological challenge you want, we have it here. We have the size and breadth that allow you to virtually change careers without ever leaving KPMG Consulting."

Microsoft
Redmond, WA

"Diversity is essential in terms of how we attract and retain people," says Santiago Rodriguez, corporate director of diversity for Microsoft. "But diversity is essential to how we design products and services and market them. That's what makes my job interesting – diversity walks through every aspect of this business."

In reviewing recruiting and retention data, Rodriguez is painfully aware of the shortage of women in software engineering and of African-Americans and Latinos in most every category. "In periods of full employment, it's an even bigger challenge," he says.

Rodriguez believes that no company is a perfect fit for everyone. "In the case of Microsoft, I was attracted by the philosophies of empowering people and meritocracy. If you are good, you will flourish here. The issues that create difference – background, race, where you come from – are less of the equation when the focus is on recognizing merit."

Microsoft is in a continuous recruiting mode. "The largest need is for what we call mission specific jobs, software design engineers and testers," says Rodriguez. "A high technology company like Microsoft also needs technically talented professionals in sales and marketing, administrative groups such as procurement and public relations and human resources."

When reviewing resumes, Microsoft looks for three characteristics. "The technical background is a given, so we are looking for resumes that scream out that a person is passionate, smart and gets things done. That's how you open eyes at Microsoft," Rodriguez adds.

"Once you come to Microsoft, you will be surrounded by people who are very smart and who can contribute to your learning. You'll have the ability to make a difference because of what you bring to the business, but also because of the products we make."

OSI
Folsom, CA

As the telecommunications industry revolutionizes and morphs into the communications industry, the pace of change is near frantic and the demand for the most talented, diverse thinking people is crucial. That's how OSI views its approach to valuing diversity - as an imperative to navigate the increasingly complex technological future.

Bud Mullinax, vice president for human resources at OSI, says, "A diverse workforce will help lead us through the ever-changing times set ahead for us. We need a workforce that is technology-wise, sales motivated and success driven. There is no one idea or definition of the people who will get us there. Rather, it's more important than ever that they are as diverse as possible."

Mullinax says OSI is looking for people to fill positions in sales, marketing, software development and professional services. "We search for candidates who have software experience, telecommunications experience and other skills. On the technical side, we are looking for people with degrees in computer science, business administration and marketing. Most important is evidence on the resume and during the interview of sheer determination, motivation and results."

In existence since 1989, OSI went public in 1995 and continues to build on its original small-company values. "We continue to believe in the small-company values of the people who work here as our number one asset," says Mullinax.

PricewaterhouseCoopers
Philadelphia, PA

When Mark Farrington, director of diversity recruiting and retention, surveys the landscape of his company and the consulting industry, he sees a clear mission. "People of color are not traditionally exposed to consulting as a career option early on in their education," he says. "We believe there is a much better chance of building a highly qualified, highly diverse, inclusive company if we concentrate on talented professionals, but also on students."

To do so, Farrington and PWC have become involved in a number of graduate school and undergraduate school initiatives to recruit interns. "We tell these students that consulting and PricewaterhouseCoopers offer outstanding ongoing learning, cutting-edge technology and that we work with the best clients in the world. You have the independence of creating solutions for clients while working with some of the best minds in the industry."

Career opportunities include the complexity of large-scale immediate projects, frequently involving global operations. For new college grads, PWC offers extended training and then participation in proposal preparation and solution development. "At PricewaterhouseCoopers, you are exposed to a broader band of experienced opportunities without leaving the organization. That's an important reason as to why people who come to our firm tend to stay," he adds. "You will have opportunities to work with established Fortune 50 companies and start-ups, all without changing the logo on your business card."

The firm is looking for individuals with experience in e-business, financial management and the functions of human capital and supply chain management, business-to-business and systems integration and evolution.

The Vanguard Group
Valley Forge, PA

As The Vanguard Group globalizes its business, it must also globalize its workforce. David Gaskin, the principal at Vanguard responsible for employee retention, college relations and diversity, says, "Working with Vanguard means working at an organization that really values its people.

"At Vanguard, we define diversity as the inclusion of people with different cultures, talents, backgrounds and experiences. We also want to assure fair treatment for all of our 10,500 crew members [how Vanguard refers to its employees], which means that our work environment should be one in which everyone is treated with respect, acceptance and dignity."

Four themes dominate Vanguard's diversity efforts – recruiting, retention, communication and training. "We've certainly increased the diversity of candidates and new crew members," says Gaskin. "Just as important is retention. We're making sure we not only recruit diverse crew members, but that we are good at keeping people, as well."

The Information Technology group at Vanguard has some unique aspects, Gaskin notes. "We are working to bring new crew members on board. Some of those recruits are foreign nationals who must adjust to a new job, a new culture, and sometimes even a new predominant language. To help these crew members assimilate, Vanguard will soon offer two learning opportunities – an acculturation workshop for the crew members and their management team to help both groups better understand their cultural values and contributions; and a communications workshop for crew members for whom English is not their native language."

Vanguard is looking for individuals who know typical IT languages, web design and architecture. "But we also need people who are flexible, who can lead, and who are enthusiastic and passionate about their field," says Gaskin.

"If you join Vanguard, you'll work with great people that you can grow with and learn from. You'll work with a leading company in the field of mutual funds – an industry that is at the forefront of cutting-edge technologies," says Gaskin. Here you'll find a learning voyage where everyone is given the opportunity to hone existing skills and build new skills. Most importantly, because IT and business professionals partner at Vanguard to develop business solutions, a very broad array of IT roles and positions are available here."

For more information on diversity in IT careers,
turn to the pages of IT Careers.
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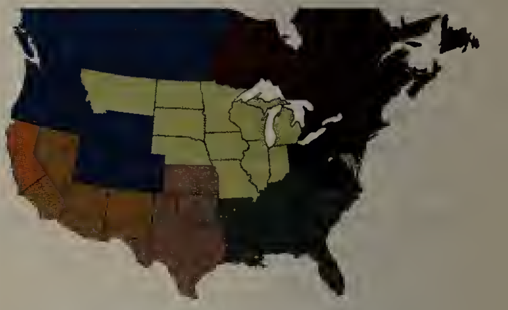

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Directory,

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prise users will get a thorough examination this week at The Burton Group's Catalyst Conference in San Diego.

IT executives will get a peek at new products from several vendors, including Netegrity and Oblix, that are designed to help firms securely expose their directories to outside users. The directory is key for controlling business partners' access to applications and data, which is a pressing issue among IT executives building e-commerce relationships.

They also will be looking at the Directory Services Markup Language (DSML), an XML specification introduced at the conference last year to great fanfare. The now emerging DSML 2.0, which will be put on a standards track, raises hopes of XML and directory integration, along with concerns over fragmentation of directory access standards.

"The directory has popped up a level in importance and the question now is, 'How do we leverage the directory to build electronic commerce applications?'" says Jamie Lewis, president of The Burton Group, a consulting firm in Midvale, Utah.

Controlling net access

One of the conference's key topics will examine the directory as a platform and explore how to use it to control access to internal systems by potentially thousands of external business partners.

"Access management is the hottest topic for us right now," says Harold Albrecht, chairman of the Network Applications Consortium (NAC), a user organization with the goal of improving interoperability of applications in heterogeneous environments. "I don't want to poke a new hole in my firewall every time someone needs access to an internal system. I need a more flexible way to manage external users across what have traditionally been rigid enterprise boundaries."

Burning issues

The Network Applications Consortium, a 10-year-old user organization, has laid out a number of issues it plans to investigate as it gathers its members at this year's Burton Group Catalyst Conference.

1. How to manage access to internal resources by outside business partners, consumers and suppliers.
2. Directory-related uses for XML, including DSML and what importance it will have for IT executives.
3. Broadening of its membership base to include service providers and consulting organizations that deal with the same application integration issues as enterprise users.

Albrecht says the directory is the foundation for solving the issue. In March, the NAC began developing a general-access management model for its members.

Those members will get a look at some new access products this week at Catalyst. Netegrity plans to unveil its Delegated Management Services (DMS), which lets companies delegate user administration to business partners. DMS lets partners manage only their portion of a host directory, deleting and adding users and assigning access rights within a set of guidelines.

Oblix will introduce Web browser-based software, dubbed NetPoint, that lets IT managers control the authentication and access of trading partners and customers to the company's extranets and Web-enabled applications. NetPoint lets customers subscribe to a host's extranet and add or delete user accounts and passwords for its employees and manage workflow processes.

In addition to access, other key issues will find prominence at Catalyst, including DSML 2.0. A year ago at the conference, e-commerce vendor Bowstreet introduced the 1.0 version with backing from Microsoft, Novell and Oracle, among others. Version 1.0 was limited, providing only a description of a directory's content. DSML 2.0 promises to add query and modification capabilities and the ability to manipulate directory data, a critical step allowing developers of XML-enabled applications to add hooks to a directory.

The Organization for the Advancement of Structured Information Standards (OASIS) has created a working group to put DSML 2.0 on a standards track. A draft specification is expected this fall.

"DSML 2.0 is more transactional and opens up a whole new arena for XML apps to use the directory," says James Tauber, director of XML technology for Bowstreet and chairman of the OASIS DSML Technical Working Group.

Many vendors, including iPlanet, Radiant Logic and Sun, will use Catalyst to demonstrate support for DSML. Radiant Logic plans to introduce Radiant One 1.5, which supports DSML 1.0. The software is a "virtual directory" that has an intelligent cache to accelerate LDAP-based access and modification of back-end database information.

But DSML 2.0 is raising some questions as XML and directories continue on a course toward convergence.

Observers are concerned about the overlap of DSML and the Lightweight Directory Access Protocol and whether LDAP, XML's Simple Object Access Protocol (SOAP) or both will become the protocol of choice for accessing a directory. LDAP isn't particularly suited to traverse corporate firewalls, while SOAP is designed just for that purpose.

"The concern is over the ability to get some sort of universal agreement," says The Burton Group's Lewis. "DSML should provide a mechanism that is protocol-independent."

Lewis says with many hands in the DSML pie, including those of OASIS and Microsoft's BizTalk.org, and the speed at which XML efforts are moving, the possibility is high for fragmentation in creating a standard set of XML tags to access the directory.

Lewis says getting a single standard is important to provide developers a simple mechanism for building directory support into XML-based applications without having to use low-level programming techniques. ◪

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Nortel,

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some other vendor as well. At this point, we're not going to use the Versalar 25000 as the peripheral or the edge: We will use a product from vendor A or B."

Vendor A is clearly Juniper. As Nortel extended the delay in the Versalar 25000, the company and Juniper signed a "memorandum of understanding" last month to jointly market, plan and implement optical core routing infrastructures for service providers. The agreement involves assurances that the two companies will foster interoperability between Nortel's OPTera optical switching and transport systems and Juniper's M-series Internet core routers.

Jain acknowledges that Nortel's progress in IP routing since the Bay acquisition has been disappointing. But Bay instantly gave Nortel leadership positions in VPNs and cable modems, and also gave Nortel 7,000 to 8,000 people trained in IP data networking, he says.

"The only place where we have had not as much success as we originally hoped is in routing," Jain says. "Part of that is [because] competition is fierce in that space."

The other part is Nortel's focus on leadership in optical networking, which is fine with some of its customers. Pathnet, a "carrier's carrier" in Reston, Va., says the company has some optical IP trials under way that will dispel any notion of Nortel not being an IP company.

Nortel has a method for binding Multi-protocol Label Switching, which is used for engineering traffic through IP and ATM networks, directly to dense wave division multiplexing gear that will drive quality of service down to the lambda level, and may be years ahead of competitors, says Gerry Sharp, Pathnet's chief technology officer. He says Nortel's technique alleviates the need to convert wavelengths to electrical impulses and back again.

"They will begin to attract more attention in this industry from an IP perspective," Sharp says of the Nortel trials. "Their IP products — this product — is an optical-to-optical solution: It is not optical-electrical-optical. This will bring them back onto the table for IP."

But until Nortel can generate revenue and significant market share with this new optical IP product, observers remain skeptical of the company's progress in IP since acquiring Bay.

"Roth basically said he was going to transform his company into an IP company. There is no evidence that that transformation has ever occurred," Communications Network Architects' Dzubeck says. ◪

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Backspin

Overhauling the Novell black hole

In "Eric vs. the Redmond Baron" (www.nwfusion.com, DocFinder 9131) earlier this month, I planted my tongue firmly in my cheek on the topic of the future of Novell. I pitched Wing Commander Eric "Clean Sweep" Schmidt against the Redmond Baron. I more than half expected a wave of complaints to land in my in-box for having the gall to characterize Novell as being shot down by Microsoft.

In February, I wrote a column entitled "Technology with emotion" (www.nwfusion.com, DocFinder 9132), in which I disagreed with the conclusions of the authors of the January feature "King of the NOS hill" (www.nwfusion.com, DocFinder 9133). In the feature, Microsoft's Active Directory Service was rated above NetWare, and the bigots from both sides had a field day.

MARK
GIBBS

Much to my surprise, I found I was riding on a storm front of spleen generated by the remarkable number of Novell fans who disagreed with the feature's conclusions. It was therefore with some surprise that I found the response to the Redmond Baron piece was mild.

Indeed, the tally for my column was one neutral response, while the rest were about as cynical on Novell's future as I am.

Do I detect a change of the market's heart? I think so. Novell has not been communicating too enthusiastically over the last few months. There have been few press releases (15 in May, only two in June and none so far in July), but they haven't said much, and users notice such things.

That's not to say the press release content isn't about good stuff, it's just that Novell seems incapable of getting the word out and getting the market excited.

For example, Novell's OnDemand Services is a promising service that provides a platform for the supply of online, for-fee goods and services. It supports short- or long-term rental or purchase through a Web interface and leverages Novell Directory Services as the control and management infrastructure.

OnDemand appears to work as intended — at least, to the extent that a company named Wizmo, an application service provider (ASP) in Minnesota, is using the system to run its business.

Then there's Novell teaming with Lucent to define a standard called Presence And Availability Management (PAM) API, which will make it possible to securely share user data in ISP and ASP environments. This is all well and good but does anyone care that much?

It seems that Novell doesn't have the right stuff — or, at least, is unable to express it if it does.

As a journalist who has a track record of admiring Novell, I would have thought the company would have kept in contact. But the first thing Novell has sent me in months is an invite to its reviewer's day in August (I shall go).

I think Novell has passed some kind of event horizon and turned into a marketing black hole, so its traditional customers have just stopped caring. In part, this has come about because Novell seems to think its target market is CXOs. Novell assumes its traditional buyers are in the bag, so why bother selling to them? Big mistake.

So what might Novell's future look like? First, there's the specter of a long, slow spiral into obsolescence. Not likely. Second, there's the possibility of acquisition by a telephone company or ISP — Novell being acquired by the likes of Lucent would be very interesting.

Finally, there's Novell being swallowed by a computer company such as IBM or Hewlett-Packard. Or perhaps Sun? Now there would be an interesting mix, although the clash of corporate styles could be tricky.

I don't know about you, but it looks to me like Novell needs a major overhaul, and the possibility of it coming from within the company seems remote.

Send your scenarios for Novell's future to nwcolumn@gibbs.com.

'NET BUZZ

The latest on the Internet/intranet industry

JOHN
FONTANA

It's been nearly a year since **Surrogate Buzz** was allowed to dribble some words into this space, so he's glad to be returning to action while **Real Buzz** is away.

Speaking of returns, former **Lotus chief Jeff Papows,** who we last saw in January reluctant to carry away a heavyweight crystal eagle from his farewell send-off at Lotusphere, revealed to Surrogate Buzz recently that he will return to the ranks of CEO.

The reason Papows has to stage a return in the first place can be traced back to April of last year. That's when Papows was blown out of the sky by a *Wall Street Journal* article alleging he had misrepresented his military aviation exploits and his academic records. For the record, Papows denied the allegations. To add insult to injury, the next month he was named in a sexual discrimination complaint.

Now some might argue that ol' Jeff will have a credibility problem when he returns this fall to lead a yet unnamed software company.

Credibility be damned! What really matters to Wall Street, IT folks and most everyone else is results. And if Papows delivers the way he did at Lotus, then April of 1999 will be just a small scab only the press will pick at.

"I'm going to say this once about all the silly stuff . . . it has no business impetus," Papows says. "I can't change it, people can think what they like. I'm doing what I'm doing . . . because I can, not because I have anything to prove. The bottom line is when I got to Lotus — Notes was something no one had heard much of. It's now a multibillion-dollar industry."

Monetary results are the hardest to argue with.

I won't compare Papows' plight with any current events, but history says judgment is decisive in this U.S. of A when it's based on money.

How do you explain a president disgraced in a sex scandal, subsequently impeached and then surviving in office to tell about it? It's called a strong economy.

How do you explain redneck relief pitcher **John Rocker,** who publicly offends most every ethnic group in one hate-filled rant, yet returns to the mound after only a slap on the wrist? It's called winning, baby.

Rocker's teammates, while repulsed by his statements, had no qualms about professing their need for him and his scary fastball to ensure championship rings and long-term free-agent contracts for all.

How do you explain the implosion of dot-com stocks? It's called results, or lack thereof.

Eventually, it's all about results and little else.

And Papows has 'em. He took over Lotus in 1996 at a time when many were laughing at IBM for having paid billions for a company critics said would be rendered obsolete by the Internet. Four years later, when Papows and his eagle flew the coop, Lotus was sitting on 50 million-plus users, Microsoft was falling over itself to catch up and IBM was scrambling to use Lotus Domino to plug a hole in its e-business story.

Put that in your stock portfolio and trade it!

Since April 1999, Papows has been added to the boards of directors of three companies, including one where a top executive publicly called him a lame duck in 1999 but was smart enough to see Papows as an asset 12 months later.

"I can tell you I've been offered more chances to run or contribute to companies than I can deal with," Papows says.

If he puts up Papows-like results at his newest gig — and Surrogate Buzz won't bet against him — look for Papows in the boardroom of your nearest Fortune 1,000 company lecturing to attentive executives on how to beat adversity and come back a champ.

He can use any tale he wants to get the message across.

While Surrogate Buzz is in seclusion for another year, he can be reached at jfontana@nww.com.

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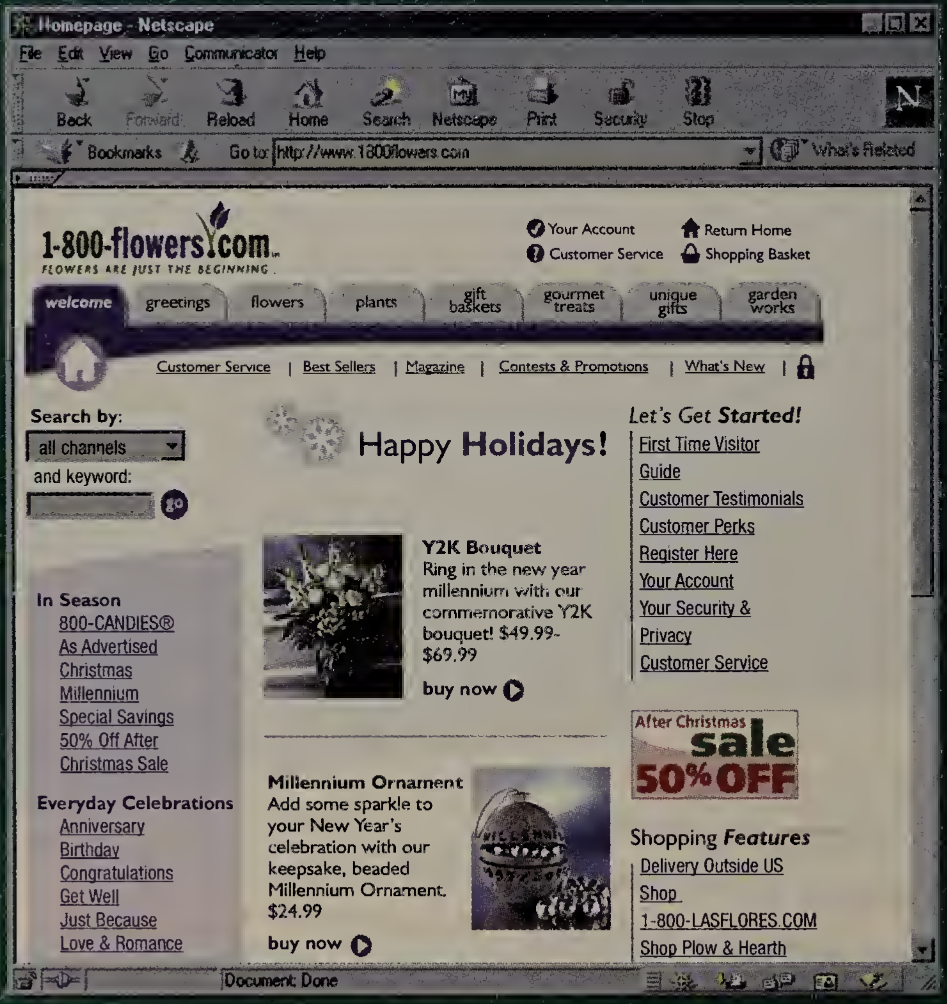

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